263

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CONTENTS

TRADE NAME	MODEL	SET AND FOLDER No.
Admiral	Chassis 19B1, C, 19C1, A, B, C, 19H1, 19K1, 19T2, A Tel. Rec. Prod. Chg. Bul. 112	263-1
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Emerson	748B, C, 777B, 787A, B, 796C, 797B, C, 798B (Ch. 120179B, 120203B, 120204B, 120205B) Tel. Rec.	263-7
Fisher	70-A	263-8
Magnavox	CMUB422BC, CTB422BC (Ch. 300 Series) Tel. Rec.	263-9
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Mitchell	1290 Recorder	263-12
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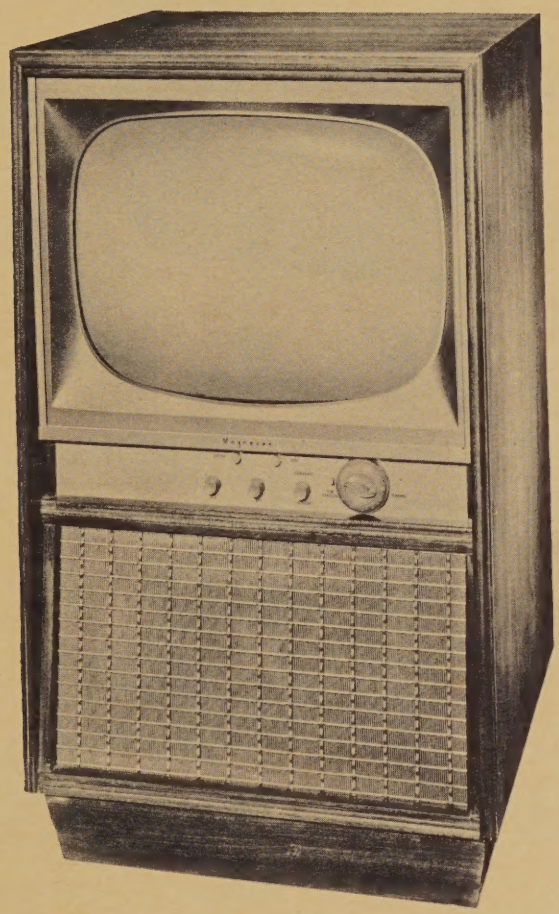

CHASSIS CT401AA

MAGNAVOX
MODEL 108, A Series

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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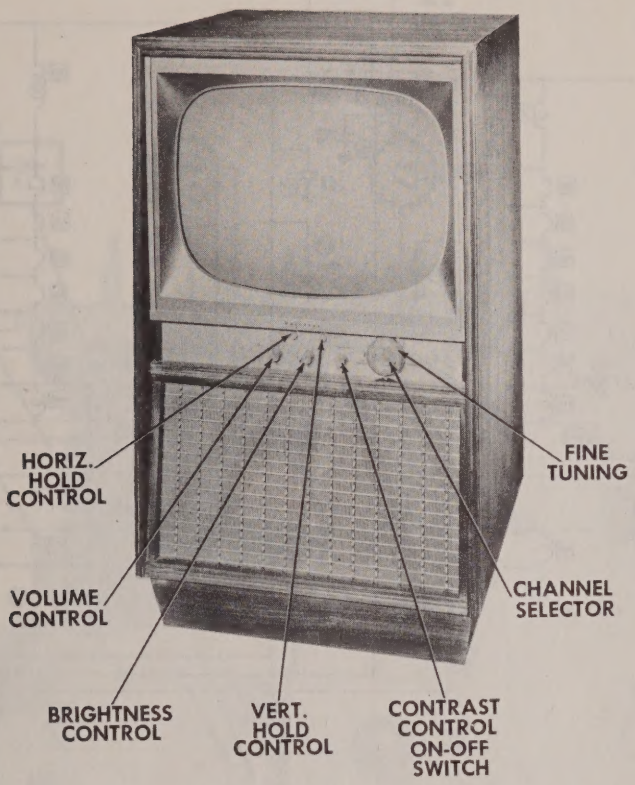

MAGNAVOX CHASSIS CT401AA

TRADE NAME	Magnavox	CHASSIS
		CMU401AA, CMU402AA, CMU403AA, CMU404AA, CMU405AA, CMU406AA, CMU407AA, CMU410AA, CMU413AA, CMU418AA, CMU419AA, CMU420AA ..... Series 108, A
		CT401AA, CT402AA, CT403AA, CT404AA, CT405AA, CT406AA, CT407AA, CT410AA, CT413AA, CT418AA, CT419AA, CT420AA,..... Series 108, A
		CU401AA, CU402AA, CU403AA, CU404AA, CU405AA, CU406AA, CU407AA, CU410AA, CU413AA, CU418AA, CU419AA, CU420AA ..... Series 108, A
MANUFACTURER	Magnavox Co., 2131 Bueter Road, Fort Wayne 4, Indiana	
TYPE SET	Television Receiver	
TUBES	Twenty	
POWER SUPPLY	110-120 Volts AC-60 Cycle	RATING 1.62 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)	

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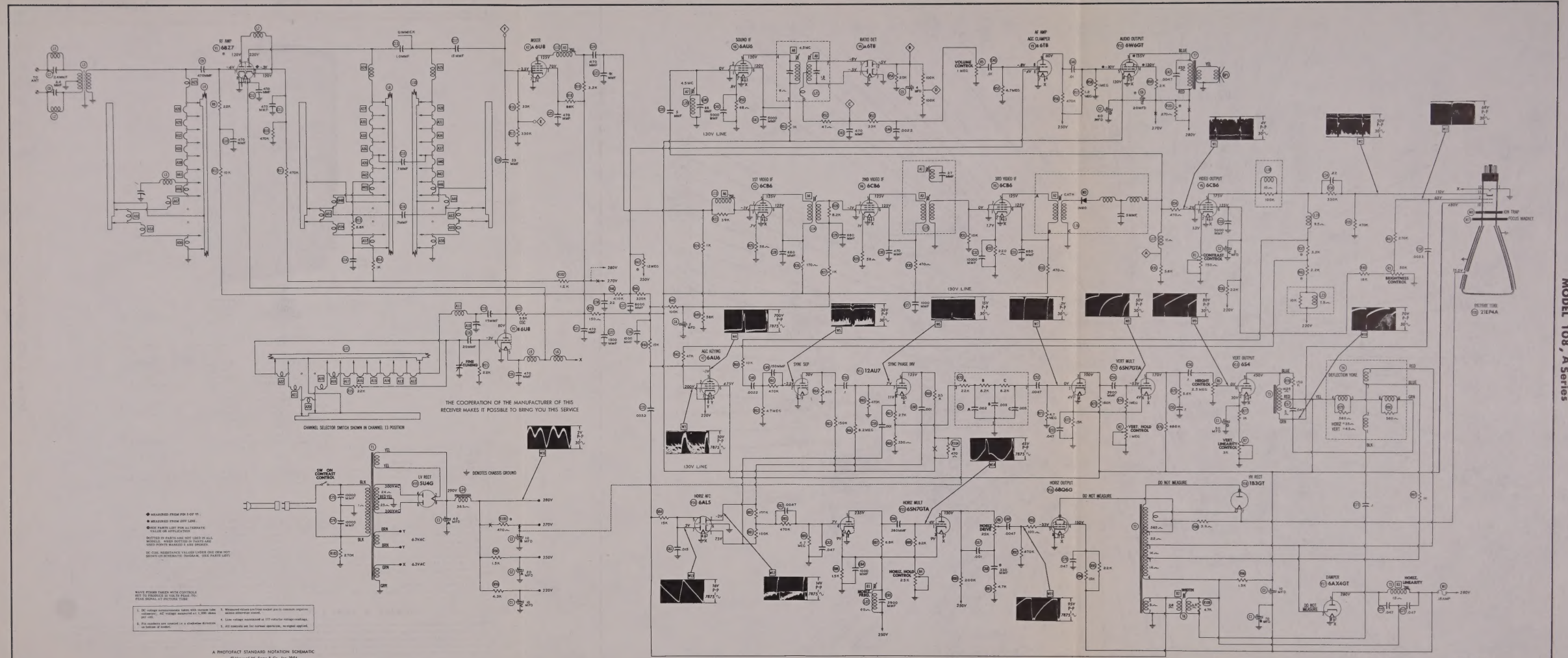
DATE 5-54 SET 239 FOLDER 6

MAGNAVOX
MODEL 108, A Series


THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION
DENOTES CHASSIS GROUND
130V LINE
MAGNAVOX MODEL 108, A Series
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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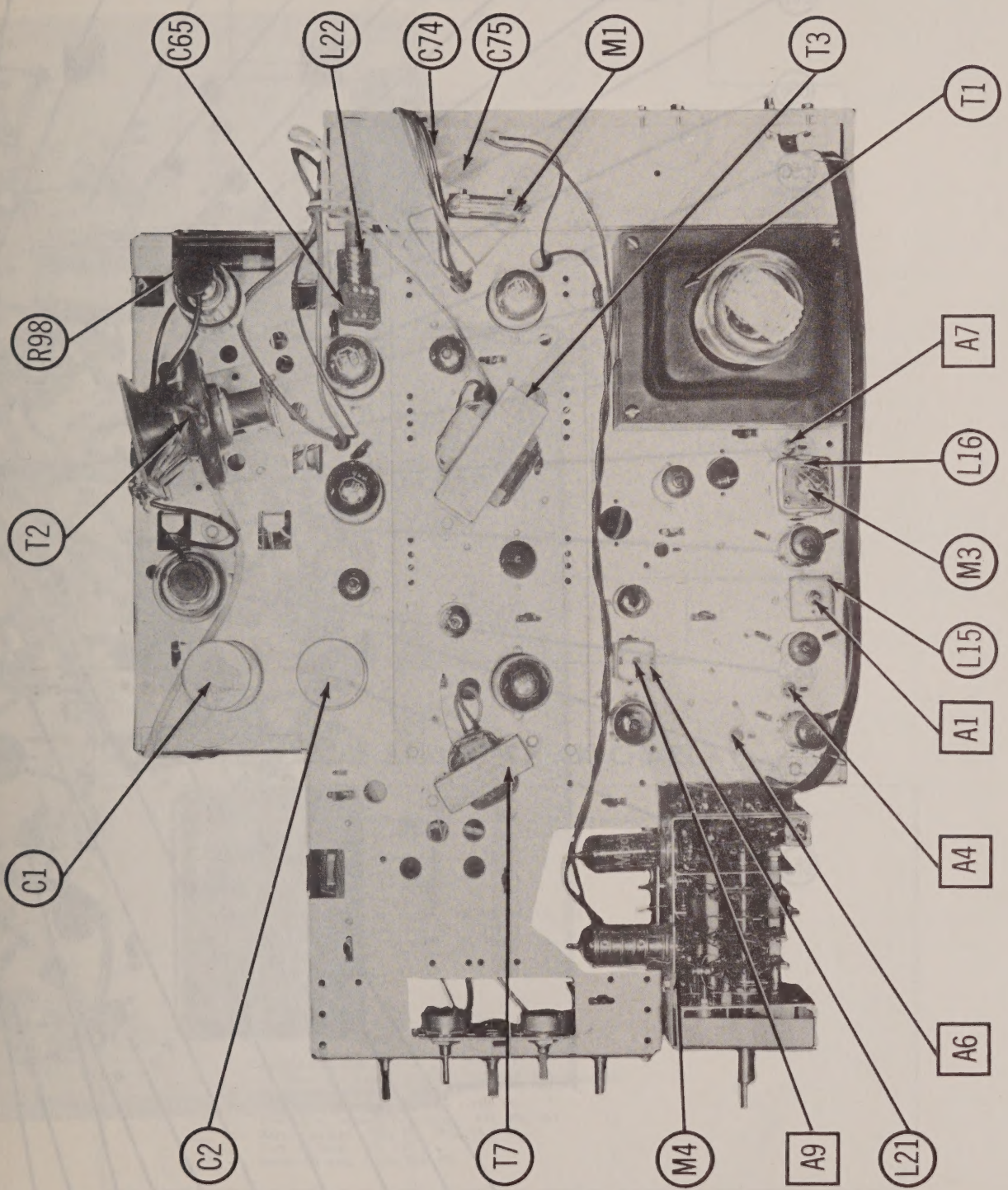

CHASSIS TOP VIEW

MAGNAVOX
MODEL 108, A Series

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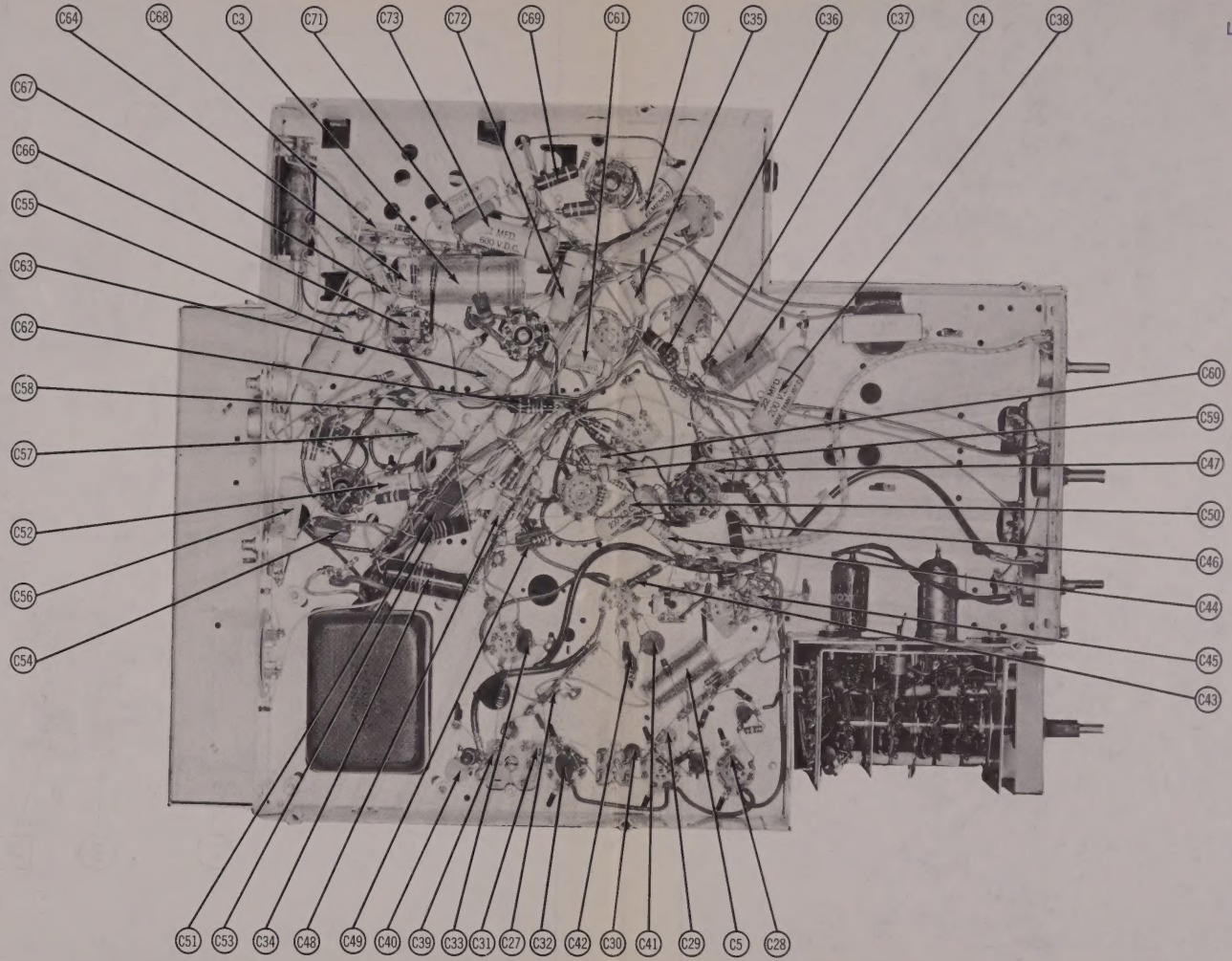

CHASSIS-BOTTOM VIEW-CAPACITOR IDENTIFICATION

TUBE PLACEMENT CHART

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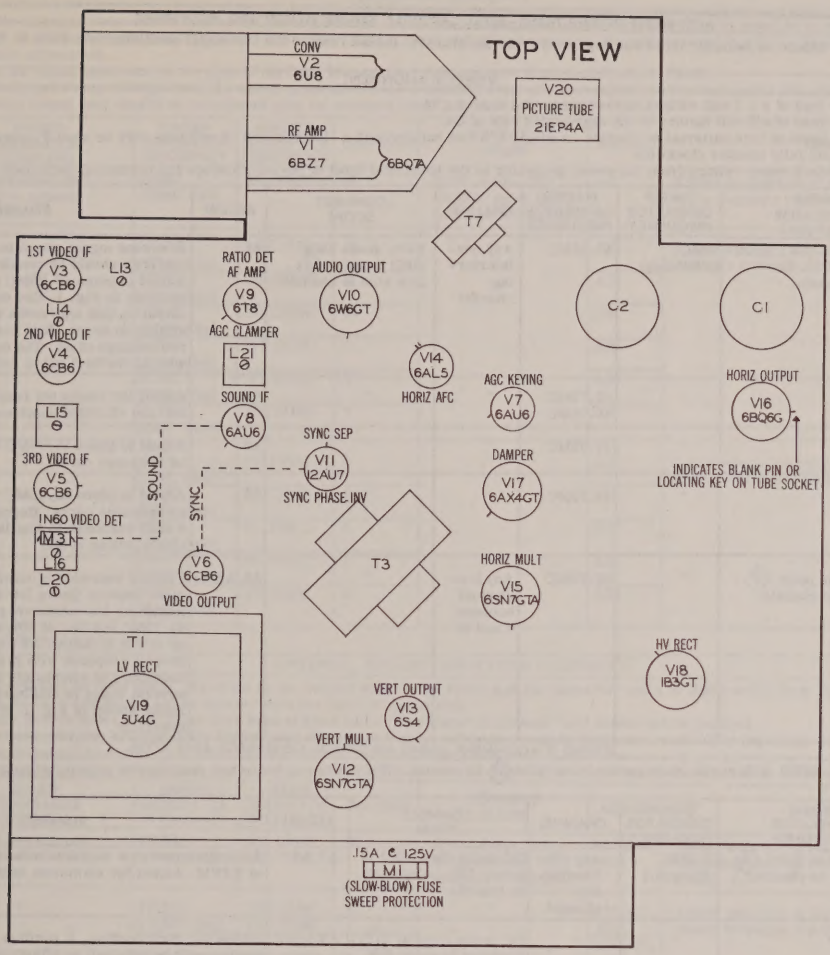


TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V19

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V10
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V20
Has pic, no sound - V8, V9, V10
Overloaded picture - V7, V9

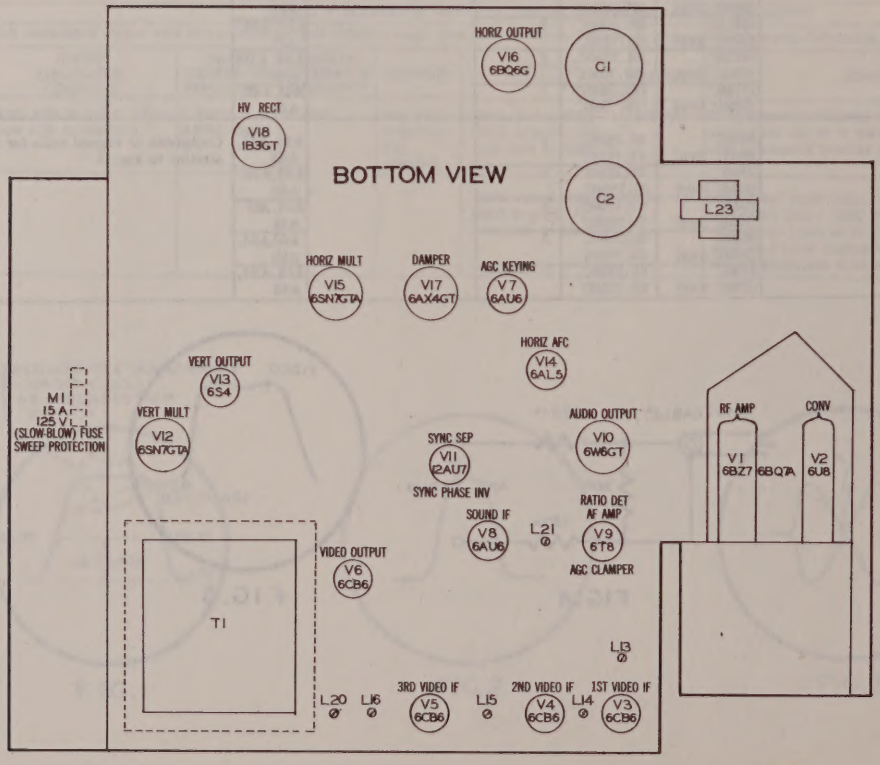
SYNC FAILURE
No vert. sync - V11, V12
No horiz. sync - V11, V14, V15
No vert. or horiz. sync - V11

SWEEP FAILURE
No raster, has sound - V15, V16, V17, V18, V20, Fuse (M1)
No vertical deflection - V12, V13
Poor vert. linearity or foldover - V12, V13
Poor horiz. linearity or foldover - V15, V16, V17
Narrow picture - V15, V16, V17, V18, V19
Vert. off freq. - V11, V12
Horiz. off freq. - V11, V14, V15

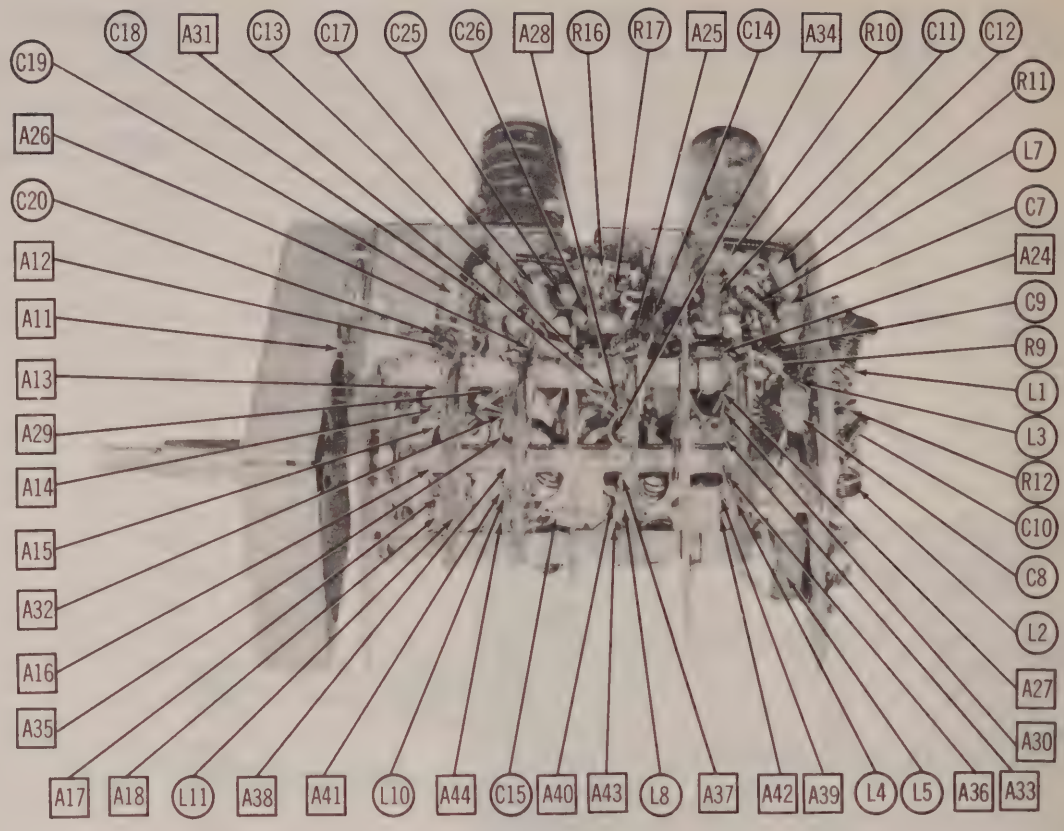
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BZ7	†2.7KΩ	250KΩ	INF	0Ω	.1Ω	INF	1Meg	0Ω	0Ω
V 2	6U8	■7KΩ	360KΩ	■68KΩ	0Ω	.1Ω	■3.5KΩ	0Ω	0Ω	22KΩ
V 3	6CB6	57KΩ	56Ω	.1Ω	0Ω	■470Ω	■470Ω	0Ω		
V 4	6CB6	57KΩ	56Ω	.1Ω	0Ω	■470Ω	■470Ω	0Ω		
V 5	6CB6	.1Ω	220Ω	.1Ω	0Ω	■470Ω	■470Ω	0Ω		
V 6	6CB6	6.1KΩ	120Ω	.1Ω	0Ω	†10KΩ	†25KΩ	0Ω		
V 7	6AU6	†53KΩ	†4.3KΩ	†4.3KΩ	†4.3KΩ	170KΩ	▲1.5KΩ	†4.3KΩ		
V 8	6AU6	.5Ω	0Ω	.1Ω	0Ω	■1KΩ	■1KΩ	68Ω		
V 9	6T8	1Meg	20KΩ	1Meg	.1Ω	0Ω	485KΩ	0Ω	4.7Meg	†470KΩ
V 10	6W6GT	470KΩ	0Ω	†260Ω	†2.5KΩ	600KΩ	INF	.1Ω	180KΩ	
V 11	12AU7	■100KΩ	5.2Meg	0Ω	.1Ω	.1Ω	■3.3KΩ	470KΩ	3KΩ	0Ω
V 12	6SN7GT	4.7Meg	▲180KΩ	1.5KΩ	1.5Meg	▲680KΩ	1.5KΩ	.1Ω	0Ω	
V 13	6S4	INF	2.5KΩ	1.5Meg	.1Ω	0Ω	1.5Meg	INF	INF	▲3KΩ
V 14	6AL5	5.3Meg	5.3Meg	.1Ω	0Ω	15KΩ	0Ω	15KΩ		
V 15	6SN7GT	110KΩ	■200KΩ	1.5KΩ	4.7Meg	†8.4KΩ	1.5KΩ	.1Ω	0Ω	
V 16	6BQ6GT	INF	.1Ω	INF	†9KΩ	470KΩ	470KΩ	0Ω	0Ω	TOP CAP ▲22Ω
V 17	6AX4GT	▲14Ω	INF	3Meg	▲1.5KΩ	†55Ω	15KΩ	.1Ω	0Ω	
V 18	1B3GT		PINS	1 - 8	HAVE	INF	RESISTANCE			TOP CAP ▲607Ω
V 19	5U4G	INF	70KΩ	INF	24Ω	INF	25Ω	INF	70KΩ	
V 20	21EP4A	0Ω	300KΩ	PIN 10 ▲1.5KΩ	PIN 11 †220KΩ	PIN 12 .1Ω				

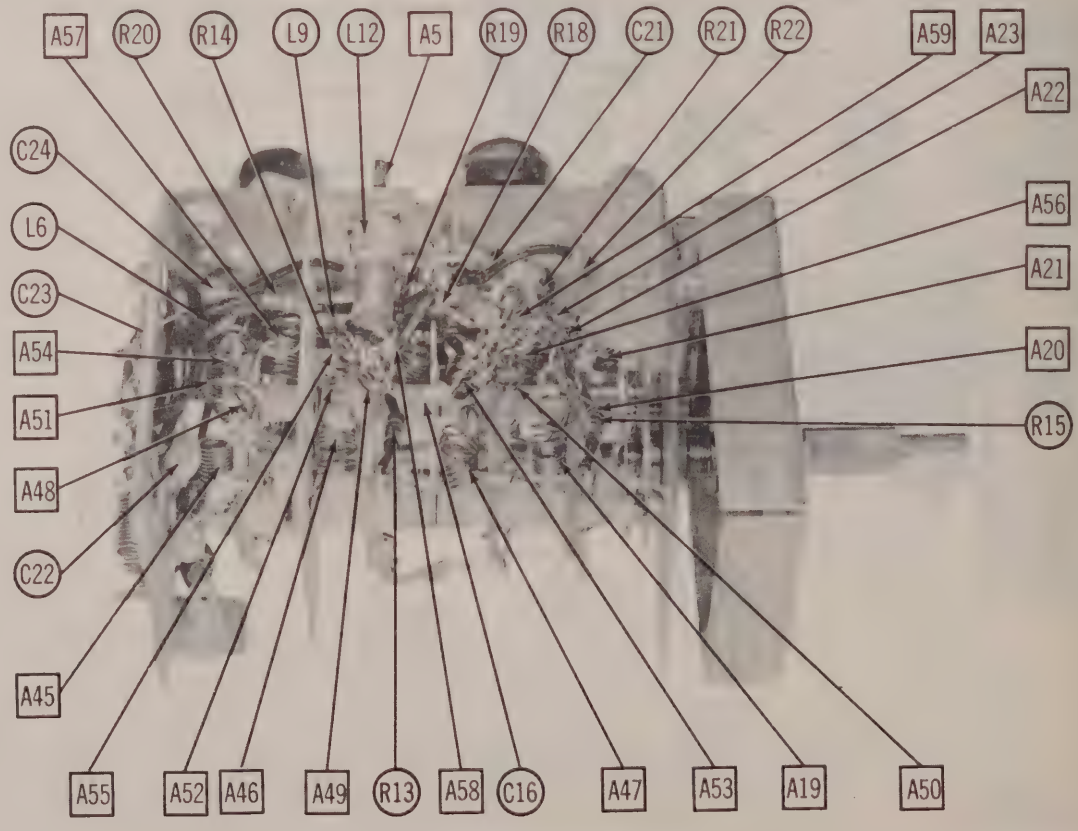
† MEASURED FROM PIN 2 OF V19
■ MEASURED FROM 130V LINE
▲ MEASURED FROM PIN 3 OF V17



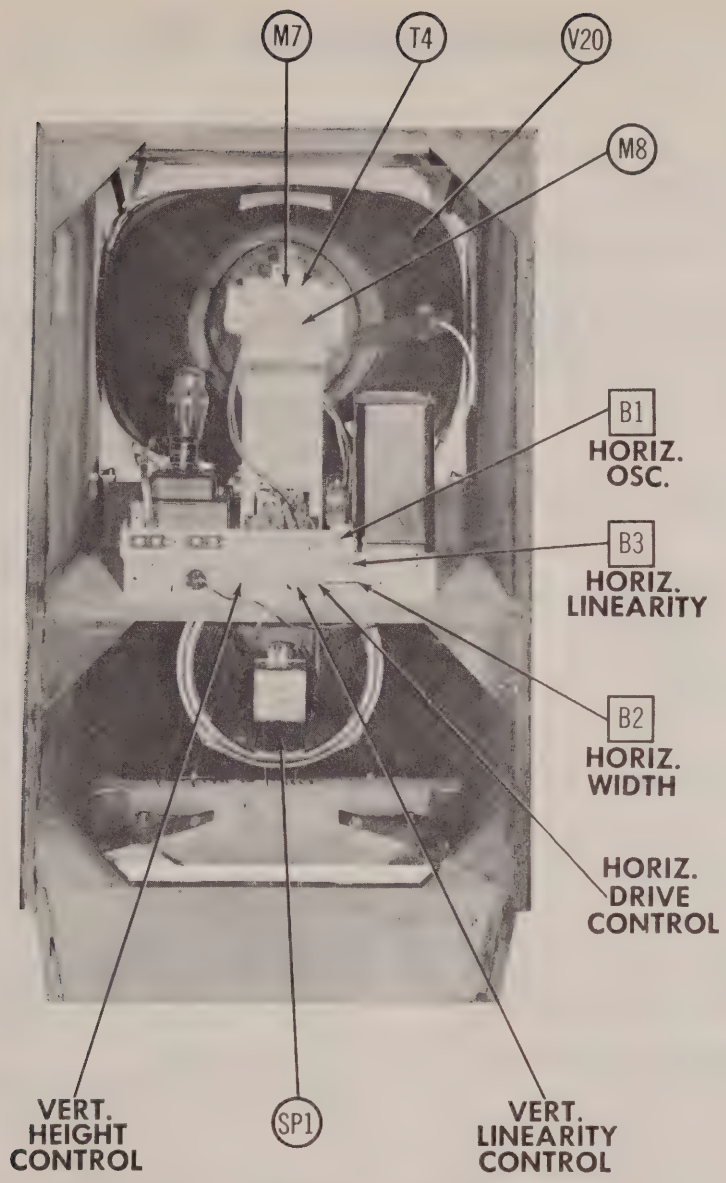
TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Set the horizontal hold control to its mid-range position.

Turn the horizontal frequency slug (B1) slowly clockwise while switching on and off channel until picture just loses sync. Turn B1 counter clockwise until picture regains sync then continue for ½ turns in the same direction. The picture should hold sync (or if not in sync, have equal number of bars) at both extremes of the horizontal hold control.

If necessary readjust B1 slightly and test for sync or pull-in as above.

Adjust horizontal drive control in a clockwise direction as far as possible without the presence of vertical white lines or compression near the center of the picture.

Adjust the width slug (B2) for a picture slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity slug (B3) for a picture that is symmetrical from left to right.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V15, V16, V17 and V19. Check adjustments B2 and B3. Check adjustment of the horizontal drive control. Check waveform W15.

If Satisfactory	If Unsatisfactory
Check T2, T4A, R94, R95, R109, C70, C71, C72, C73 and other associated components.	Check C69, C66, C67, R89, R90, R92, R8, L22 and other associated components.

DRIVE LINES

Check adjustment of the horizontal drive control (R8). Check by substitution V15, V16 and V17. Check C67, C68, C69, C71, C72, T2, T4A, R97 and other associated circuit components.

COMPRESSED LEFT SIDE

Check adjustment of the horizontal drive control, B2 and B3. Check components associated with the horizontal output and damper stages especially T2 and T4A.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V15, V16 and V17. Check C63 for open. Check T2, T4A, T5, T6 and other associated components.

XMAS TREE EFFECT

Substitute V15. Check L22, C65, C66 and other associated components.

VERTICAL

LOSS OF SWEEP

Check by substitution V12 and V13. Check waveform W9.

If Satisfactory	If Unsatisfactory
Check T3, T4B, R77, R7 and other associated components.	Check R6, R73, R76, C56, C54 and other associated components.

INSUFFICIENT SWEEP

Check adjustment of height and vertical linearity controls. Proceed as outlined under "Loss of Sweep".

COMPRESSED AT BOTTOM

Check by substitution V12 and V13. Check T3, T4B, C1D and other associated components.

COMPRESSED AT TOP

Check by substitution V12 and V13. Check C55, C56, R75, R76, R6 and other associated circuit components.

FOLDS

Check by substitution V12 and V13. Check associated circuit components for failure or change of value.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Substitute V11. Check associated components especially C48, C50, R60, R63 and R66.

LOSS OF VERTICAL SYNC - HORIZONTAL SYNC SATISFACTORY

Substitute V11 and V12. Check waveform W7.

If Satisfactory	If Unsatisfactory
Check components associated with V12 especially C54.	Check vertical integrator, C52 and other associated components.

LOSS OF HORIZONTAL SYNC - VERTICAL SYNC SATISFACTORY

Check by substitution V14 and V15. Check associated components especially C59, C60, C61, C65, C66, R81, R82, R84, R89, L22 and R88.

HORIZONTAL BENDING

Check by substitution V14 and V15. Check horizontal AFC filter network (R83, R85, C62 and C63) for failure or change of value.

VIDEO

LOSS OF VIDEO

Substitute V6 Check L18, L19, R38, C34, picture tube and other associated components.

SOUND BARS (4.5MC Beat)

Adjust tuner fine tuning for best picture and sound. Check video IF alignment.

POOR CONTRAST

Substitute V6. Check video detector assembly, contrast control, picture tube and other associated components.

NEGATIVE PICTURE

Check by substitution V7, V6, V4, V3 and V1. Check AGC network components. Check picture tube.

SMEAR

Substitute V6. Check video detector crystal and assembly. Check C34, R37, R43, R38, L18, picture tube and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check V1, V3, V4, V5 and V6 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V8, V9 and V10. Check stages V9B and V10 using audio signal generator. Apply audio signal across R55.

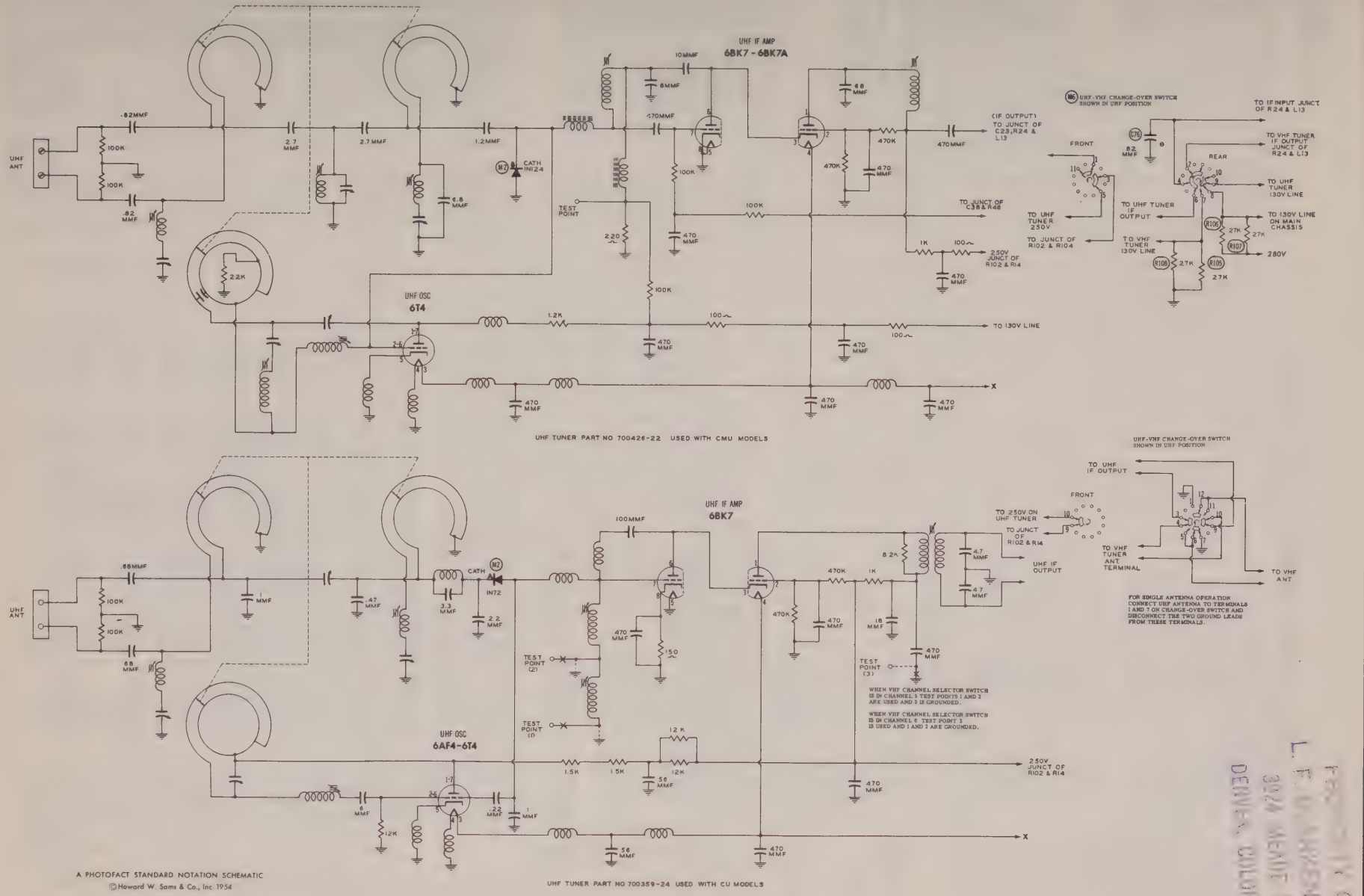
If Satisfactory	If Unsatisfactory
Check ratio detector and audio IF alignment and components.	Check components associated with V9B and V10, especially C46 and T7.

BUZZ

Adjust tuner fine tuning for best picture and sound. If still unsatisfactory, substitute V9 and realign audio IF and detector stages. Check C5 for leakage.

DISTORTED

Follow procedure outlined under "Weak or No Sound".


UHF IF AMP
6BK7 - 6BK7A
UHF OSC
6T4
UHF TUNER PART NO 700426-22 USED WITH CMU MODELS
UHF IF AMP
6BK7
UHF OSC
6AF4-6T4
UHF TUNER PART NO 700359-24 USED WITH CU MODELS
UHF-VHF CHANGE-OVER SWITCH SHOWN IN UHF POSITION
FOR SINGLE ANTENNA OPERATION CONNECT UHF ANTENNA TO TERMINALS 1 AND 7 ON CHANGE-OVER SWITCH AND DISCONNECT THE TWO GROUND LEADS FROM THESE TERMINALS.
WHEN VHF CHANNEL SELECTOR SWITCH IS IN CHANNEL 5 TEST POINTS 1 AND 2 ARE USED AND 3 IS GROUNDED.
WHEN VHF CHANNEL SELECTOR SWITCH IS IN CHANNEL 6 TEST POINT 3 IS USED AND 1 AND 2 ARE GROUNDED.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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UHF-TUNER SCHEMATIC

MAGNAVOX
MODEL 108 , A Series

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No	USE	REPLACEMENT DATA: MAGNAVOX PART No.	STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1A	RF Amplifier	6BZ7	6BZ7	9AJ	Tuner 700379
B	RF Amplifier	6BQ7A	6BQ7A	9AJ	
V2	Converter	6U8	6U8	9AF	
V3	1st Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Output	6CB6	6CB6	7CM	
V7	AFC Keying	6AU6	6AU6	7BK	
V8	Sound IF Amp.	6AU6	6AU6	7BK	
V9	Ratio Detector-AF Amplifier-AGC Clamper	6T8	6T8	9H	
V10	Audio Output	6W6GT	6W6GT	7B	
V11	Sync Separator-Sync Phase Inv.	12AU7	12AU7	9A	
V12	Vert. Mult.	6SN7GTA	6SN7GTA	8BD	
V13	Vert. Output	6S4	6S4	9AC	
V14	Horiz. AFC	6AL5	6AL5	6BT	
V15	Horiz. Mult	6SN7GTA	6SN7GTA	8BD	
V16	Horiz. Output	6BQ6G	6BQ6G	6AM	
V17	Damper	6AX4GT	6AX4GT	6CG	
V18	HV Rectifier	1B3GT	1B3GT	3C	
V19	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No	REPLACEMENT DATA: MAGNAVOX PART No	SYLVANIA	GENERAL ELECTRIC	WESTINGHOUSE	RETMA BASE TYPE	NOTES
V20A	21ZP4A	21ZP4A	21ZP4A	21ZP4A	12N	① Circuit changes necessary
	21EP4A	21EP4A	21EP4A	21EP4A	12N	
		21KP4B			12N	
		21SP4 ①			12D	
		21ZP4 ①			12M	
		21ZP4A ①			12L	
B	17BP4A	17BP4A	17BP4A	17BP4A	12N	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: MAGNAVOX PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	±40	350	270021-69	AFH3-46		C037		FP378	TVL-3792	
B	±70	350		PR350/50		HR505		TC39	TVA-1308	
C	±10	350								
D	50	50								
C2A	±20	350								
B	±10	350	270021-81	AFH4-49		D041		FP434.5	TVL-4620	
C	±5	350		PR6025-30-		HR6025		TC68	TVA-1613	
D	60	300		20						
C3	10	350	270027-23	PR8350/10		HR1045		TC62	TVA-1604	
C4	2	50	270027-33	R25K8		BHR1-50		TC302	TVA-1301	
C5	4	50	270027-10	PR8100/4		HR550		TC30	TVA-1303	
C6	20	350								Note 1
C7	24		250207-83							
C8	24		250207-83							
C9	470		250207-50	SI470	D6-471	TP46	GPLK-471	UC-5347	SGA-T47	
C10	470		250207-50	SI470	D6-471	TP46	GPLK-471	UC-5347	SGA-T47	
C11	470		250207-50	SI470	D6-471	TP46	GPLK-471	UC-5347	SGA-T47	
C12	470		250207-50	SI470	D6-471	TP46	GPLK-471	UC-5347	SGA-T47	
C13	1.0		250212-2							
C14	470		250207-50	SI470	D6-471	TP46	GPLK-471	UC-5347	SGA-T47	
C15	.7		250209-112							
C16	.7		250209-112							
C17	15		250207-5	SD8	D6-150	TP1J	GPLK-150	UC-5415	SGA-Q15	
C18	3.3		250209-121	SID.3MP0	TCZ-3.3	TQ06	MPDA-3R3	ST-5539	STCCB-V33	
C19	15		250068-12							
C20	20		250068-13							
C21	470		250207-50	SI470	D6-471	TP46	GPLK-471	UC-5347	SGA-T47	
C22	1500		250175-3	BPD-0015	DD-152	K091	811-0015	DC-5315	SHK-D15	
C23	91									
C24	470		250207-50	SI470	D6-471	TP46	GPLK-471	UC-5347	SGA-T47	
C25	470		250207-50	SI470	D6-471	TP46	GPLK-471	UC-5347	SGA-T47	
C26	470		250207-50	SI470	D6-471	TP46	GPLK-471	UC-5347	SGA-T47	
C27	1000		250175-16	BPD-001	DD-102	K069	811-001	DC-531	SHK-D1	
C28	680		250218-4	BPD-000680	D6-681	K065	GPZK-681	UC-5368	SGA-T68	
C29	680		250218-4	BPD-000680	D6-681	K065	GPZK-681	UC-5368	SGA-T68	
C30	470		250218-6	BPD-000470	D6-471	K060	GPZK-471	UC-5347	SGA-T47	
C31	680		250218-4	BPD- 000 680	D6-681	K065	GPZK-681	UC-5368	SGA-T68	
C32	1000		250175-2	BPD-01	DD-103	K082	GPZ-333-103	DC-511	SHK-S1	
C33	5000		250175-1	BPD-005	DD-502	K080	811-005	DC-525	SHK-D5	
C34	.22	200	250205-15	P286-22		P22P22		PT4022	2TM-P22	
C35	.0033	600	250201-4	P668-0033	D6-332	CUBED33	GP3-333-332	PT6D33	6TM-D33	
C36	1000		250175-14	BPD-001	DD-102	K069	811-001	DC-531	SHK-D1	
C37	5000		250175-1	BPD-005	DD-502	K080	811-005	DC-525	SHK-D5	
C38	.22	200	250205-15	P286-22		P22P22		PT4022	2TM-P22	
C39	5			815	D6-050		GPZK-050	TP5S	SGA-T5	
C40	68		250218-7							
C41	5000		250175-1	BPD-005	DD-502	K080	811-005	DC-525	SHK-D5	
C42	5000		250175-1	BPD-005	DD-502	K080	811-005	DC-525	SHK-D5	
C43	470		250068-127	SI470	D6-471	TP46	GPLK-471	UC-5347	SGA-T47	
C44	.0022	400	250212-2							
C45	.01	400	250211-7	P488-01	D6-103	CUB4D1	GP3-333-103	PT411	4TM-S1	
C46	.01	400	250211-5	P488-01	D6-103	CUB4D1	GP3-333-103	PT411	4TM-S1	
C47	.0047	400	250211-5	P488-0047	D6-473	CUB4D47	GP3-333-473	PT4347	4TM-D47	
C48	.0022	400	250211-3	P488-0022	D6-223	CUB4D22	GP3-333-222	PT4233	4TM-D22	
C49	150	500	250189-99	1455-00015		5WT15		MC356	1FM-S15	
C50	.1	200	250202-13	P288-1	DF-104	PJ2P1		PT401	2TM-P1	

PARTS LIST & DESCRIPTION

CAPACITORS (cont)

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: MAGNAVOX PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C51A	2000		250188-1	*PA-110-1	*PC-100	*1S17M1	*1405-01	DC-522	*10IC1	
B	5000							DC-525		
C	5000							DC-525		
C52	.0047	400	250211-5	P488-0047	D6-472	CUB4D47	GP3-333-472	PT4347	4TM-D47	
C53	.047	200	250212-5							
C54	3900	500	250181-5041	1464-004		BR6D39		MCE403	1FM-34	
C55	.1	400	250212-13							
C56	.1	400	250212-13	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C57	.047	400	250211-11	P488-047		CUB4D47		PT4347	4TM-S47	
C58	.0033	800	250201-4	P668-0033	D6-332	CUB6D33		PT6233	6TM-D33	
C59	.001	400	250212-4							
C60	.001	400	250212-2							
C61	.015	200	250212-1							
C62	.0047	400	250212-4							
C63	.047	200	250212-11	P288-047		PJ2S47		PT4347	2TM-S47	
C64	1000	500	250159-153	1464-001		1R5D1		MCE355	1FM-21	
C65	3900	500	250181-5041	1464-004		1R3D39		MCE455	1FM-34	
C66	500	500	250159-5000	1479-0004		5R5736		MCE243	1FM-34	
C67	.001	400	250211-1	P488-001	D6-102	CUB4D1	GP2L-102	PT401	4TM-D1	
C68	330	500	250159-5059	1479-00035		5R5733		MCE241	1FM-335	Note 2
C69	.0047	400	250211-5	P488-0047	D6-472	CUB4D47	GP2-333-472	PT4347	4TM-D47	
C70	.047	400	250211-11	P488-047		CUB4D47		PT4147	4TM-S47	
C71	.047	400	250211-11	P488-047		CUB4Z47		PT4147	4TM-S47	
C72	.047	400	250211-11	P488-047		CUB4S47		PT4147	4TM-S47	
C73	.1	600	250201-13	P683-1	DF-104	CUB6P1		PT601	6TM-P1	
C74	10000		250218-2	BPD-01	DD-103	K082	811-01	DC-511	SHK-S1	
C75	10000		250218-3	BPD-01	DD-103	K082	811-01	DC-511	SHK-S1	
C76	82	500	250159-2045							Note 3

Note 1. Used only in chassis with serial number after 111250 ending with even number and serial number after 113063 ending with odd number.
Note 2. Value changed to 470MMF on all chassis after serial number 111439 ending with an even number and serial number 113043 ending with an odd number.
Note 3. Used only in Models employing UEF (Value may be 82MMF for CMU version or 91MMF (part #250159-46 for CT version).
* Items C50A, C50B, C50C, R70A, R70B, R70C are combined in one unit.

CONTROLS

ITEM No.	RATING: RESIST. ANCE	WATTS	REPLACEMENT DATA: MAGNAVOX PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	750Ω	½	D220186G38	QIT-105			U-3	Contrast
B	Switch		Not Req.	76-1			UB-26	Attach to R1A
R2A	1 Meg	½	D220126-39	QU-137	A47-1Meg-S	B-68	U-54	Vert. Hold
B	Shaft		Not Req.	VQ	DFS-1/4	Not Req.	Not Req.	Attach to R2A
R3A	50KΩ	½	D220126G37	QU-123	A47-50K-S	B-51	U-35	Brightness
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R3A
R4A	25KΩ	½	D220126G38	QU-130	A47-25K-S	B-26	U-29	Horiz. Hold
B	Shaft		Not Req.	VQ	DFS-1/2	Not Req.	Not Req.	Attach to R4A
R5A	2.5Meg	½	D220126-40	QU-139	A47-2.5Meg-S	B-70	U-56	Volume
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R5A
R7	3000Ω	1	220120-3		39-3000			Vert. Linearity -wire wound
R8A	25KΩ	½	D220126-141	QU-130	A47-25K-S	AB-38	SU-29	Horiz. Drive
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R8A

RESISTORS

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: MAGNAVOX PART No.	IRC PART No.	NOTES
R9	22KΩ	½	230104-78	BTS-22K	
R10	470KΩ	½	230104-94	BTS-470K	
R11	470KΩ	½	230104-94	BTS-470K	
R12	10KΩ	½	230104-74	BTS-10K	
R13	680Ω	½	230104-72	BTS-680Ω	
R14	100Ω	½	230104-62	BTS-100Ω	
R15	22KΩ	½	230104-78	BTS-22K	
R16	33KΩ	½	230104-80	BTS-33K	
R17	330KΩ	½	230104-22	BTS-330K	
R18	68KΩ	½	230104-84	BTS-68K	
R19	330Ω	½	230104-58	BTS-330Ω	
R20	150Ω	½	230104-52	BTS-150	
R21	22KΩ	½	230104-78	BTS-22K	
R22	6800Ω	½	230105-72	BTA-6800	
R23	39KΩ 5%	½	230069-197	BTS-39K 5%	
R24	1000Ω	½		BTS-1000	
R25	56Ω	½	230104-47	BTS-56	
R26	470Ω	½	230104-58	BTS-470	
R27	1000Ω	½		BTS-1000	
R28	8200Ω 5%	½	230094-181	BTS-8200 5%	
R29	56Ω	½	230104-47	BTS-56	
R30	470Ω	½	230104-58	BTS-470	
R31	10KΩ 5%	½	230094-183	BTS-10K 5%	
R32	220Ω	½	230104-54	BTS-220	
R33	470Ω	½	230104-58	BTS-470	
R34	470Ω	½	230104-58	BTS-470	
R35	56000 5%	½	230094-177	BTS-5600 5%	
R36	22KΩ	½	230104-78	BTS-22K	
R37	33000 5%	3		BTA-3300 5%	Note 3
R38	330KΩ	½	230104-92	BTS-330K	
R39	470KΩ	½	230104-94	BTS-470K	
R40	18KΩ	½		BTS-18K	
R41	270 KΩ	½	230104-81	BTS-270K	
R42	47KΩ	½	230104-83	BTS-47K	
R43	2200Ω	1	230105-66	BTA-2200	Note 4
R44	15KΩ	2	230106-78	BTB-15K	
R45	330KΩ 5%	½	230094-219	BTS-330K 5%	
R46	470KΩ	½	230104-94	BTS-470K	
R47	12 Meg	½	230094-217	BTS-12 Meg	Note 1
R48	100KΩ 5%	½	230094-207	BTS-100K 5%	

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: MAGNAVOX PART No.	IRC PART No.	NOTES
R49	56KΩ	½	230094-201	BTS-56K	
R50	68Ω	½	230104-48	BTS-68	
R51	1000Ω	½		BTS-1000	
R52	47Ω	½	230104-46	BTS-47	
R53	33KΩ	½	230104-80	BTS-33K	
R54	20KΩ 5%	½	230094-190	BTS-20K 5%	
R55	4.7Meg	½	230104-106	BTS-4.7Meg	
R56	470KΩ	½	230104-94	BTS-470K	
R57	1.2Meg5%	½	230094-233	BTS-1.2Meg5%	
R58	1 Meg 5%	½	230094-231	BTS-1 Meg 5%	
R59	20000 5%	½	230095-166	BTA-2000 5%	
R60	10KΩ	½	230104-74	BTS-10K	
R61	470KΩ	½	230104-94	BTS-470K	
R62	4.7Meg	½	230104-106	BTS-4.7Meg	
R63	150KΩ	½	230104-88	BTS-150K	
R64	47KΩ	½	230104-83	BTS-47K	
R65	470KΩ	½	230104-94	BTS-470K	
R66	5.6Meg	½	230104-109	BTS-5.6Meg	
R67	2700Ω 5%	½	230094-169	BTS-2700 5%	
R68	330Ω	½	230104-56	BTS-330	
R69	33000 5%	½	230094-171	BTS-3300 5%	
R70A	22KΩ			BTS-22K	
B	6300Ω		±250186-1	BTS-6300	
C	8200Ω			BTS-8200	
R71	4.7Meg	½	230104-106	BTS-4.7Meg	
R72	1500Ω	½	230104-64	BTS-1500	
R73	180KΩ	½	230105-89	BTS-180K	
R74	1 Meg	½		BTS-1 Meg	
R75	5600Ω	½	230104-71	BTS-5600	
R76	680KΩ	½	230104-96	BTS-680K	
R77	1000Ω	½		BTS-1000	
R78	150KΩ	½	230105-88	BTS-150K	
R79	56Ω	½		BTS-560	
R80	560Ω	½		BTS-560	
R81	100KΩ 5%	½	230094-207	BTS-100K 5%	
R82	100KΩ 5%	½	230094-207	BTS-100K 5%	
R83	470KΩ	½	230104-94	BTS-470K	
R84	15KΩ	2	230106-78	BTB-15K	
R85	4.7Meg	½	230104-106	BTS-4.7Meg	
R86	1500Ω 5%	½	230094-163	BTS-1500 5%	

RESISTORS (cont)

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: MAGNAVOX PART No.	IRC PART No.	NOTES
R87	68000 5%	½	230094-179	BTS-6800 5%	
R88	82K± 5%	½	230104-85	BTS-82K 5%	
R89	200K 5%	½	230104-214	BTS-200K 5%	
R90	1500Ω	½	230104-64	BTS-1500	
R91	4700Ω	½	230104-70	BTS-4700	
R92	470KΩ	½	230104-94	BTS-470K	
R93	100Ω	½	230104-50	BTS-100	
R94	15KΩ	2	230106-78	BTB-15K	
R95	22KΩ	1	230105-78	BTA-22K	
R96	3500Ω	1	230105-84	BTA 1500	
R97	1000Ω	2	230106-82	BTB-1000	
R98	3.9Ω	½			

ITEM No	RATING: OHMS	WATT	QUAN	REPLACEMENT DATA: MAGNAVOX PART No.	IRC PART No.	NOTES
R99	4500Ω	5	1	240071-1		
R100	470Ω	1	1	230105-58	BTA-470	Note 2
R101	270Ω	1				Note 2
R102	1200Ω	1			BTA-1200	
R103	270KΩ	1	1	230104-91	BTS-270K	Note 2
R104	470Ω	1			BTS-470	Note 2
R105	27KΩ	1			BTS-27K	Note 5
R106	27KΩ	1			BTS-27K	Note 5
R107	27KΩ	1			BTS-27K	Note 5
R108	470Ω	1			BTS-470	Note 5
R109	4700Ω	1			BTS-4700	

Note 1. Some models may use a 10 Meg resistor in this application.
Note 2. Not used in all models.
Note 3. Some models may use a 2200Ω resistor in this application.
Note 4. Some models may use a 3300Ω resistor in this application.
Note 5. Used for CMU chassis tuner connections only.
* Items R70A, R70B, R70C, C50A, C50B, C50C are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI	SEC 1	SEC 2	REPLACEMENT DATA: MAGNAVOX PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC	580VCT	5VAC	300072-1		P-8333				
		220A	@3A							
	SEC 3	SEC 4	SEC 5							
	6.3VAC @ 2.6A	6.3VAC @ 9.3A								

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: MAGNAVOX PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T2	Horiz. Output Trans.	360560-1			D-34⑥ WC-11	2327① ⑪		FLY-8 & WC-20 ⑥ ⑦ T-36254
T3	Vert. Output Trans.	320067-1	A-8141	A-3039	A-1041K	2367①	21806	
		320067-1④						
T4A	Yoke-Horiz. (18.5MH)	360587	DY-11A⑧	MDF-12⑧	Y-22 ⑦	2322D ⑤	DF805 ⑤	
B	Yoke-Vert. (38MH)	360587-1⑨						
T5	Horiz. Lin. Coil(1.9MH)	360585-1	MWC-4⑧	MWC-12⑧	21HR1 ⑧			
T6A	Width Coils (4.4-29MH)	360585-1			⑮			
B	Width Coils (.35-2.3MH)							

① Remove original width coil and jumper R110. Connect terminal #8 to terminal #7, then connect original terminal #1 to new terminal #8, original #3 to new #5 , original "T" to new "T", original #4 to new #3. Connect orange and black terminals of WC-11 across terminals #3 and #1, blue and red terminals of WC-11 to original terminals #5 and #7. If the picture is out of phase, reverse blue and red terminals.
② Drill new mounting holes.
③ Remove original width coil and jumper R110, then connect original terminal #1 to new terminals#2, original #3 to new #8, original "T" to new #7, original #4 to new #6. Connect primary of WC-20 across #5 and #6, secondary to original terminals #5 and #7. If the picture is out of phase, reverse secondary.
④ Alternate vertical output transformer.
⑤ Alternate deflection yoke.
⑥ Remove horizontal damping network and connect blue lead of original yoke to terminal #2 or #7.
⑦ Use original yoke network.
⑧ Jumper terminals #2 and #7 and connect as in original circuit.
⑨ Drill new mounting hole or use original slider and core.
⑩ Connect to coded blue and red terminals.
⑪ Connect original terminal #1 to new terminal #10, original #3 to new #8, original #4 to new #3, original #5 to new #2, original #7 to new #1. Connect a 47MMF capacitor from terminal #8 (red lead of yoke)to open end of R97. (original terminal "T" connection).

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	USE	IMPEDANCE: PRI.	SEC.	MAGNAVOX PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T7	3.8KΩ	3.3Ω	320068-G1		A-8323①	A-3018	S-4X ①	21D10		① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V C IMP	REPLACEMENT DATA: M.GNAVOX PART No.	VIKING PART No.	QUAM PART No.	NOTES
SP1	12"	PM	3.3Ω	583620	12J11	12A4A	

COILS (RF-IF)

ITEM No.	USE	DC RES.: PRI.	SEC.	REPLACEMENT DATA: MAGNAVOX PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	IF Trap	0Ω		380415-54				
L2	IF Trap	0Ω		380415-54				
L3	Ant. Trans.	0ΩCT	0Ω	380490-2				
L4	Ant. Coils	0Ω						
L5	IF Trap	3Ω		380372-8				3.3 Microhenries (IRC part #CLA)
L6	Fil. Choke	.22Ω		380372-1				.47 Microhenry (IRC part #CLA)

PARTS LIST & DESCRIPTION (continued)

COILS (cont)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA MAGNAVOX PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L7	Neutr. Coil	0Ω		360415-66				
L8	RF Coils	0Ω						
L9	Fil. Choke	.22Ω		360372-1				.47 Microhenry (IRC part #CLA)
L10	Mixer Grid Coils	0Ω						
L11	Osc. Coils	0Ω						
L12	Conv. Plate	0Ω		360540-1	17-4524 *		6219 †	
L13	1st. Video IF	.1Ω		360540-1	17-4524 *		6219 †	
L14	2nd. Video IF	.1Ω	.1Ω	360581-1	17-4522		6219	
L15	3rd. Video IF	.1Ω	.1Ω	360582-1			6233 ■	Includes trap
L16	4th. Video IF	.1Ω	.1Ω	360583-1				Includes 1N60 Crystal detector, 5MMF Cap., & 2 Series Peak. Coils
L17	Shunt Peaking Coil	11Ω		360443-28	19-3500	TV-188	6174	450 Microhenries
L18	Series Peaking Coil	10Ω		360443-31	19-3300 ▲		6155 ▲	340 Microhenries, wound on 100KΩ resistor
L19	Shunt Peaking Coil	9.5Ω		360443-30	19-3300	TV-185	6155	310 Microhenries
L20	Sound IF	.5Ω		360584-1	17-3400	TV-151	1469	
L21	Ratio Det.	6Ω	1.8ΩCT	360588-1	17-3497	TV-115	6205	Tertiary winding -.6Ω
L22	Horiz. Osc.	60Ω		360579-1	19-1576	TV-163	6210	
L23	Shunt Peaking Coil	7.5Ω		360443-29	19-3250 ♦	TV-185 ♦	6181 ♦	240 Microhenries, wound on 10KΩ resistor

* Use winding with 56KΩ shunt resistor.
† Use one winding only.
■ Use adaptor plate.
▲ Parallel with 100 KΩ resistor.
♦ Parallel with 10KΩ resistor.

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA MAGNAVOX PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L24	.220ADC	38.5Ω	.58 Hy.	320058-1			C-23X ①		

① Drill one new mounting hole.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA MAGNAVOX PART No. FUSE	MAGNAVOX PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG S/B	1.5A 125V	180157-24		313.150 (3AG S/B - .15A)	357001	MDL 15/100	4405

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA MAGNAVOX PART No.	SYLVANIA PART No.		NOTES
M2A	1N72	530033-1	1N82 or A		UHF Mixer (Tuner 700359-24, CU Models)
B	1N124	530035-1			UHF Mixer (Tuner 700426- 22, CMU Models)
M3	1N60		1N60		Video Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	MAGNAVOX PART No.	NOTES
M4A	Tuner	700379-32	VHF- CT & CU Models.
B	Tuner	700379-42	VHF - CMU Models.
M5A	Tuner	700359-24	UHF- CU Models
B	Tuner	700426-22	UHF- CMU Models
M6	Switch	160238-1	UHF-VHF Changeover
M7	Focus Magnet	360569-1	Includes centering device
M8	Ion Trap	360492-2	

TROUBLE SHOOTING AIDS (cont)

PROPERTY OF
L. T. SANKENSHIP
3924 WADE ST.
DENVER, COLORADO

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly, switch on volume control and T1. If filaments light, substitute V19. Check B+ filter and decoupling components.

SMALL AND/ OR DIM PICTURE

Substitute V19. Check B+ filter network components.

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check fuse M1. Check by substitution V15, V16, V17 and V18. Check waveform W15.

If Satisfactory	If Unsatisfactory
Check T2, T4A, R98, R94, R95, C70 and other associated components.	Check C67, C69, R89, R92, R8, C66 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V15, V16, V17, V18 and V19. Check picture tube. Follow procedure outlined under "Loss of High Voltage".

BLOOMING

Check by substitution V15, V16, V17, V18 and V19. Check T2, T4A, R98, R94, R95, C70, picture tube and other associated components.

GENERAL

RASTER SOUND NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER PICTURE NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER NO SOUND NO PICTURE

Check by substitution V1, V2, V3, V4 and V5. Check video detector assembly. Check video IF and tuner components.

NO RASTER NO SOUND

Follow procedure outlined under "Dead Set".

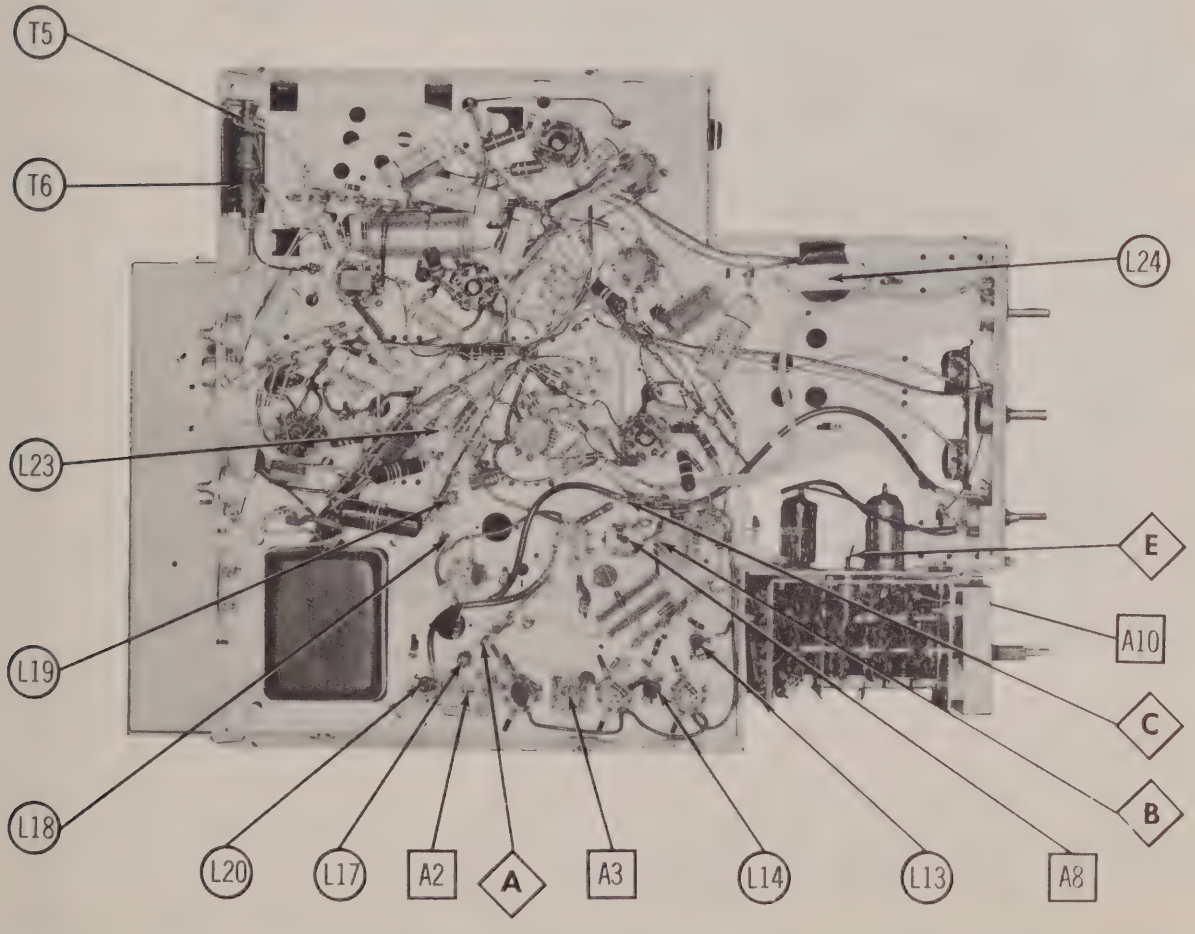
KEYSTONE EFFECT

Check T4, R97, R79 and R80.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR & ALIGN. IDENTIFICATION

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the RF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

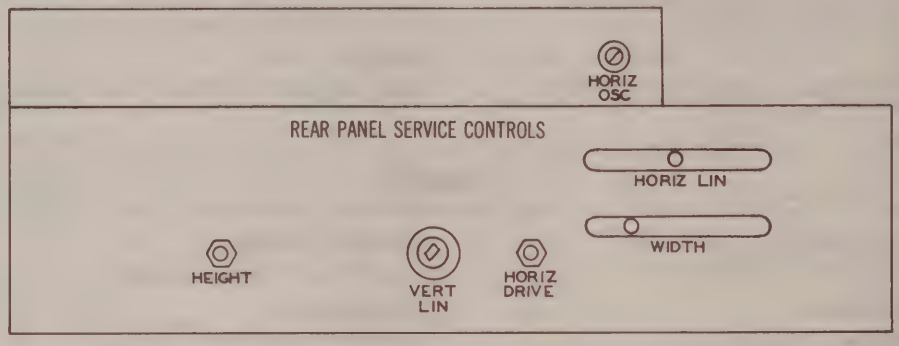
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove two (2) bolts holding metal strip at bottom of safety glass. Remove metal strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the rear panel of the chassis. Set the horizontal hold control at the mid-position of its range and adjust the horizontal frequency slug (L22) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L21) located on top of chassis. (See tube placement chart).

FUSES

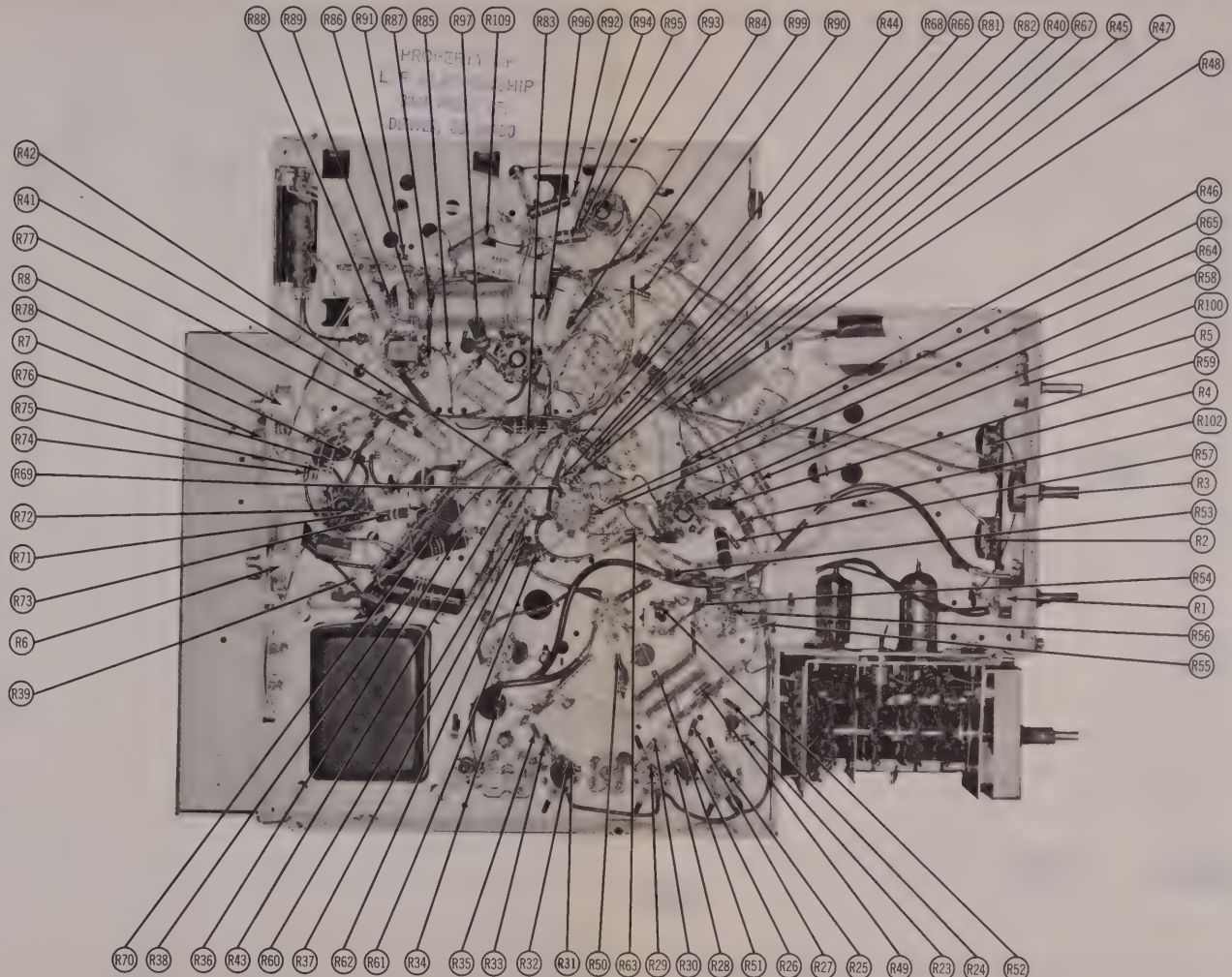
One fuse is used for horizintal sweep circuit protection. (For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by means of a centering lever on the PM focusing assembly. Adjust the centering lever from side to side, and up and down until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

1. Remove 7 push on type control knobs from front panel.
2. Remove 7 wood and 1 metal screws. Remove rear cover.
3. Disconnect speaker plug.
4. Remove 6 chassis bolts. Remove chassis.
5. Remove 4 speaker nuts. Remove speaker.



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

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SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 2 IN SET 210

Admiral Ch. 19B1, 19C1 , 19F1, 19F1A, 19H1 and 19K1 are covered in Photofact Folder 2 - Set 210.

Several new models and chassis have now been added to this group. A list of all the models, with the chassis used in each is given below.

MODEL	CHASSIS	MODEL	CHASSIS
C2246	19F1B	121DX16L	19K1
T1811	19B1, 19B1C	121DX17	19C1
T1812	19B1, 19B1C	121DX17A	19C1, 19F1
T1822	19B1, 19B1C	121DX17L	19K1
T2211	19F1B	221DX15	19C1
T2211A	19T2A	221DX15A	19C1, 19F1
T2212	19F1A, 19F1B	221DX15L	19K1
T2222	19F1, 19F1C	221DX16	19C1
T2226	19F1	221DX16A	19C1, 19F1
T2242	19K1	221DX16L	19K1
17DX10	19B1	221DX17	19C1
17DX11	19B1	221DX17A	19C1, 19F1
17DX12	19B1	221DX17L	19K1
121DX10	19C1	221DX26	19C1
121DX11	19F1A	221DX26A	19F1
121DX12	19C1	221DX26L	19K1
121DX12A	19C1, 19F1	221DX38	19C1
121DX16	19C1	221DX38A	19C1, 19F1
121DX16A	19C1, 19F1	222DX15	19H1

ADMIRAL CHASSIS 19B1, 19B1C, 19C1, 19F1, 19F1A, 19F1B, 19F1C, 19H1, 19K1, 19T2, A

Ch. 19B1

Chassis 19B1 may be considered as the basic chassis for this group. The pentode tuner (part #94D52-1, -2) and a 17BP4A picture tube are used in Ch. 19B1. The tone control is omitted in Ch. 19B1. All other chassis are similar to chassis 19B1, except for different tuners, picture tubes, chassis lay-out, etc. A list of the variations for each chassis is given below.

Ch. 19B1C

Chassis 19B1C is identical to late production of chassis 19B1, except for the following:

The DX range finder control (R5) is omitted. A schematic is given in Fig. 1 which shows the revised circuit.

The $\frac{1}{2}$ of a 12AU7 (V12), formerly used as sync clipper, is used as sync separator, the $\frac{1}{2}$ of a 12AU7 (V12), formerly used as sync separator is used as vertical oscillator, and the $\frac{1}{2}$ of a 6U8 (V5), formerly used as vertical oscillator, is used as sync clipper. A partial schematic is given in Fig. 2, which shows the revised sync and vertical circuit. In addition when this circuit is used the horizontal lock range trimmer capacitor (B6) is replaced by a fixed 82MMF, ±10%, mica capacitor.

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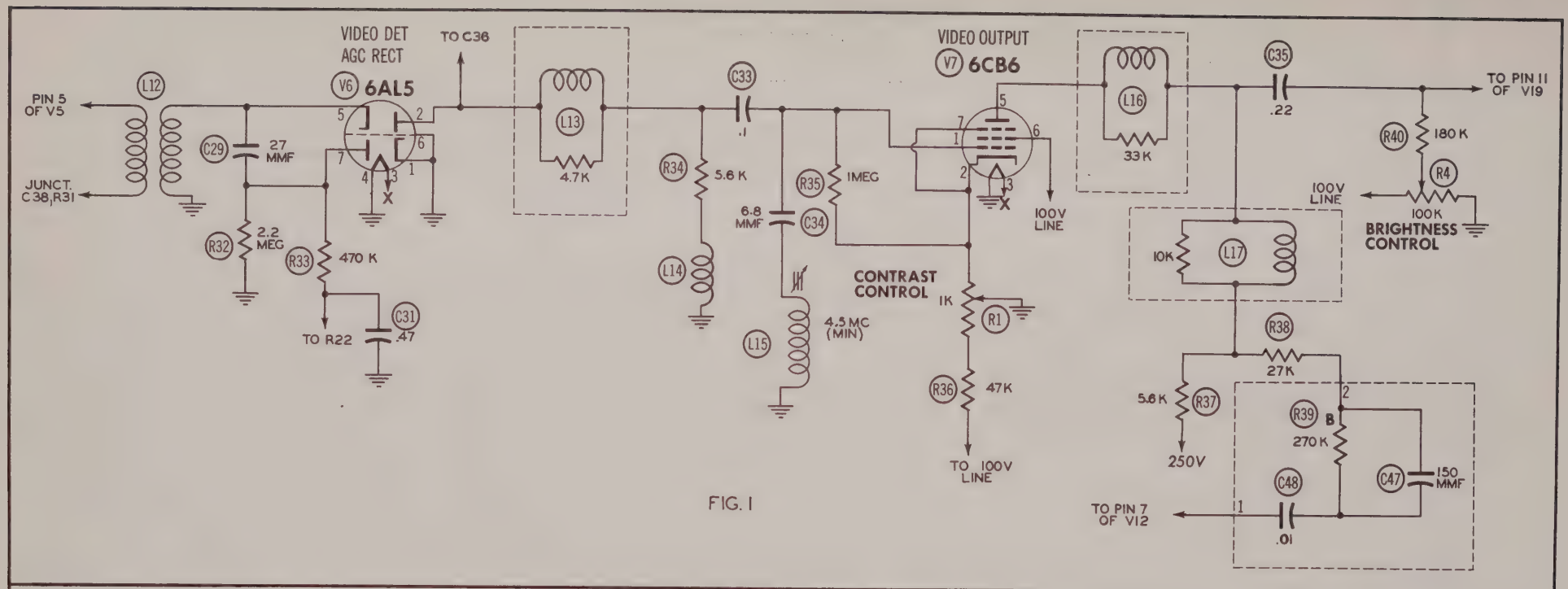
VIDEO DET
AGC RECT
V6 6AL5
TO C36
PIN 5
OF V5
L12
JUNCT.
C38,R31
C29 27 MMF
R32 2.2 MEG
R33 470 K
TO R22
C31 .47
L13
4.7K
C33 .1
R34 5.6 K
L14
6.8 MMF C34
R35 1MEG
L15
4.5 MC (MIN)
VIDEO OUTPUT
V7 6CB6
CONTRAST CONTROL 1K R1
R36 47K
TO 100V LINE
100V LINE
L16
33 K
C35 .22
TO PIN 11 OF V19
R40 180 K
R4 100K BRIGHTNESS CONTROL
L17
10K
R38 27K
5.6K R37
250V
R39 B 270K
C47 150 MMF
C48 .01
TO PIN 7 OF V12

FIG. 1

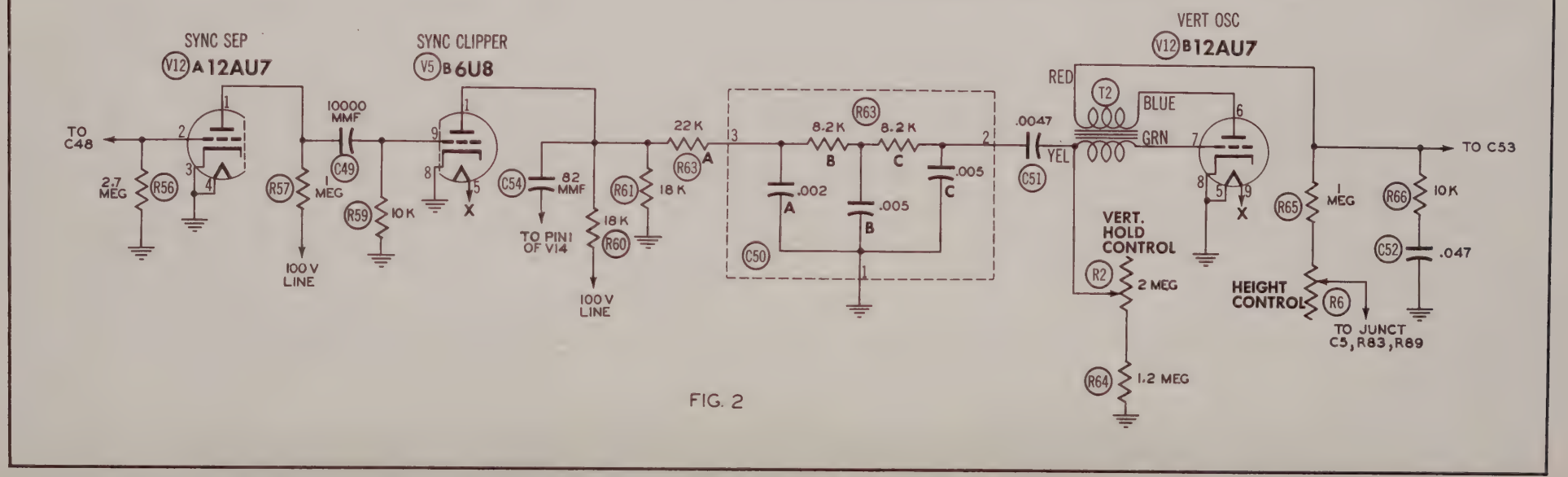
SYNC SEP
V12 A 12AU7
SYNC CLIPPER
V5 B 6U8
TO C48
2.7 MEG R56
10000 MMF C49
1 MEG R57
100 V LINE
10 K R59
C54 .82 MMF
TO PIN1 OF V14
18 K R61
18 K R60
100 V LINE
22 K R63 A
R63 8.2 K B
8.2 K C
.002 A
.005 B
.005 C
C50
.0047 C51
VERT OSC
V12 B 12AU7
RED
T2
BLUE
GRN
YEL
TO C53
VERT. HOLD CONTROL R2 2 MEG
R64 1.2 MEG
R65 1 MEG
R66 10 K
C52 .047
HEIGHT CONTROL R6
TO JUNCT C5, R83, R89

FIG. 2

Ch. 19C1	Chassis 19C1 is identical to chassis 19B1, except for the following: The 94D46-2 or 94D46-3 tuner is used in chassis 19C1. A schematic of this tuner is given on page 17 in Photofact Folder 2 — Set 206. These two tuners are identical, except for shaft length. When the tuner is used the alternate video IF circuit, shown in the upper right hand corner of the schematic on page 2 (Photofact Folder 2 — Set 206) is used. Chassis 19C1 also uses a 20DP4A picture tube and tone control is included in the chassis.
Ch. 19F1, A	Chassis 19F1 and 19F1A are identical to chassis 19C1, except a 21WP4 or 21WP4X picture tube is used. In Ch. 19F1A the tone control is also omitted.
Ch. 19F1B, C	Chassis 19F1B and 19F1C are identical to later production of Ch. 19F1 and 19F1A, except for the following: The DX range finder control (R5) is omitted in Ch. 19F1B and 19F1C. A partial schematic is given in Fig. 1, which shows this revised circuit. The $\frac{1}{2}$ of a 12AU7 (V12), formerly used as sync clipper, is used as sync separator, the $\frac{1}{2}$ of a 12AU7 (V12), formerly used as sync separator, is used as vertical oscillator and the $\frac{1}{2}$ of a 6U8 (V5), formerly used as vertical oscillator, is used as sync clipper. A partial schematic is given in Fig. 2, which shows the revised sync and vertical oscillator circuit. In addition, when this circuit is used the horizontal lock range trimmer capacitor (B6) is replaced by a fixed 82MMF, ±10%, mica capacitor.
Ch. 19H1	Chassis 19H1 is identical to chassis 19C1, except a 21EP4A picture tube is used.
Ch. 19K1	Chassis 19K1 is identical to chassis 19C1, except a 21ZP4A picture tube is used.
Ch. 19T2, A	Chassis 19T2 and 19T2A are identical to Ch. 19B1C, except a 21WP4 picture tube is used. In chassis 19T2 the tone control is also included in the chassis. The tone control is omitted in Ch. 19T2A.
Runs 1 & 2	Production Changes thru Run 2 are covered in Photofact Folder 2 — Set 210. Later production changes are given below.
Run 3 (Except Ch. 19B1)	1ST AND 2ND VIDEO IF AMPLIFIERS REVISED The 1st and 2nd video IF amplifiers (V3 and V4) B+ voltages were connected in parallel, instead of in series as in earlier production, in order to apply AGC voltage to the tubes. A partial schematic is given in Fig. 3 which shows this circuit. TO REDUCE SNOW A voltage divider network was added in the AGC circuit to reduce the amount of AGC voltage applied to the tuner in respect to the 1st and 2nd video IF amplifiers. The partial schematic given in Fig. 3 also shows this circuit.
Run 4	TO IMPROVE HORIZONTAL SYNC STABILITY An 8.2KΩ resistor was added between terminal 3 of the vertical integrator C-R unit (C50, R63) and pin 1 of V12. This resistor is shown as R62 in the schematic on page 2 in Photofact Folder 2 — Set 210.
Run 5	VERTICAL RETRACE BLANKING ADDED A vertical retrace blanking circuit was added in all chassis, Run 5 and higher. This circuit is shown as R41, R42, C70 and C71 in the schematic on page 2 of Photofact Folder 2 —Set 210.
Run 6	TUNER SHAFT LENGTH INCREASED The tuner shaft length was increased, in all chassis stamped Run 6 and higher, in order to accommodate future installation of UHF tuner. The 94D46-3 cascode tuner is used in all chassis, except 19B1, C and 19T2, A. Ch. 19B1, C and 19T2, A use the 94D52-2 pentode tuner. These tuners are identical to the 94D46-2 and 94D52-1 tuners, respectively, except for shaft length.

Run 7	C-R UNITS CHANGED The vertical integrator C-R unit (C50-R63) was changed from part #63B6-2 to part #63B6-11. This unit is identical to the original, except R63A is not included in the unit. When this unit is used the 8.2KΩ resistor (R62) added in Run 4 is not used and a separate 22KΩ resistor is used in place of R63A. This change was made to improve horizontal sync stability. The sync C-R unit (R39-C47) was changed from part #63B6-4 to part #63B6-8. This unit is identical to the original unit, except C48 is included in the unit and R39A is not. When this unit is used R38 is changed to 27KΩ. Partial schematics are given in Fig. 4 and 5 which show the connections to the two new C-R units.
Run 9	COMPONENT CHANGE In all Run 9 and higher chassis R41, R42, C70 and C71, which were added in Run 5 for vertical retrace blanking, were replaced by a C-R unit (part #63C6-12). The partial schematic in Fig. 6 shows the connections to this unit.
Run 10	COMPONENT CHANGE C33 was changed from .1MFD, 200V, capacitor to a .1MFD, 400V, unit (part #64B9-7).
Run 12	TO INCREASE THE RANGE OF THE VERTICAL HOLD CONTROL In sets using a 12AU7 tube as vertical oscillator R64 was changed from 1.2Meg to 1.5Meg. In some sets a 2Meg vertical hold control (part #75C13-22) is used. Replacement may be made with either the 1.5Meg or 2Meg control.
Run 13	COMPONENT CHANGE To eliminate horizontal sync instability due to C61 changing value slightly after set has warmed up, C61 was changed to a .01MFD, ±10%, capacitor (part #64A2-16). NOTE: If replacement of C61 is attempted in the field complete adjustment of the horizontal oscillator may have to be made. See page 11, Photofact Folder 2 —Set 210.
Run 15. & R17	TO IMPROVE SYNC STABILITY An 18MMF, ±10% mica, high pass filter capacitor was added from the junction of R38 and R39 to ground. The addition of this capacitor eliminates high frequency components of the video signal from passing into the sync circuits.
Run 17 (Ch. 19B1, 19F1, A)	The ½ of a 12AU7 (V12) formerly used as sync clipper, is used as sync separator, the ½ of a 12AU7 (V12), formerly used as sync separator, is used as vertical oscillator, and the ½ of a 6U8 (V5), formerly used as vertical oscillator, is used as sync clipper. A partial schematic is given in Fig. 2, which shows the revised sync and vertical oscillator circuits. In addition, when this circuit is used, the horizontal lock range trimmer capacitor (B6) is replaced by a fixed 82MMF, ±10%, mica capacitor.
Run 19	TO PREVENT RF AMP FROM DRAWING EXCESSIVE PLATE CURRENT In all 19 series chassis using the cascode tuner (page 17, Photofact Folder 2 — Set 210) a 22KΩ, 1 watt, resistor was added in series with the 1.5KΩ, RF amplifier plate load resistor, to 260V. In addition to the preceding changes the fuse (M1) has been changed from 1/4 amp., 250V, to 3/8 amp., 250V. For replacement purposes the 3/8 amp. fuse should be used in all chassis.

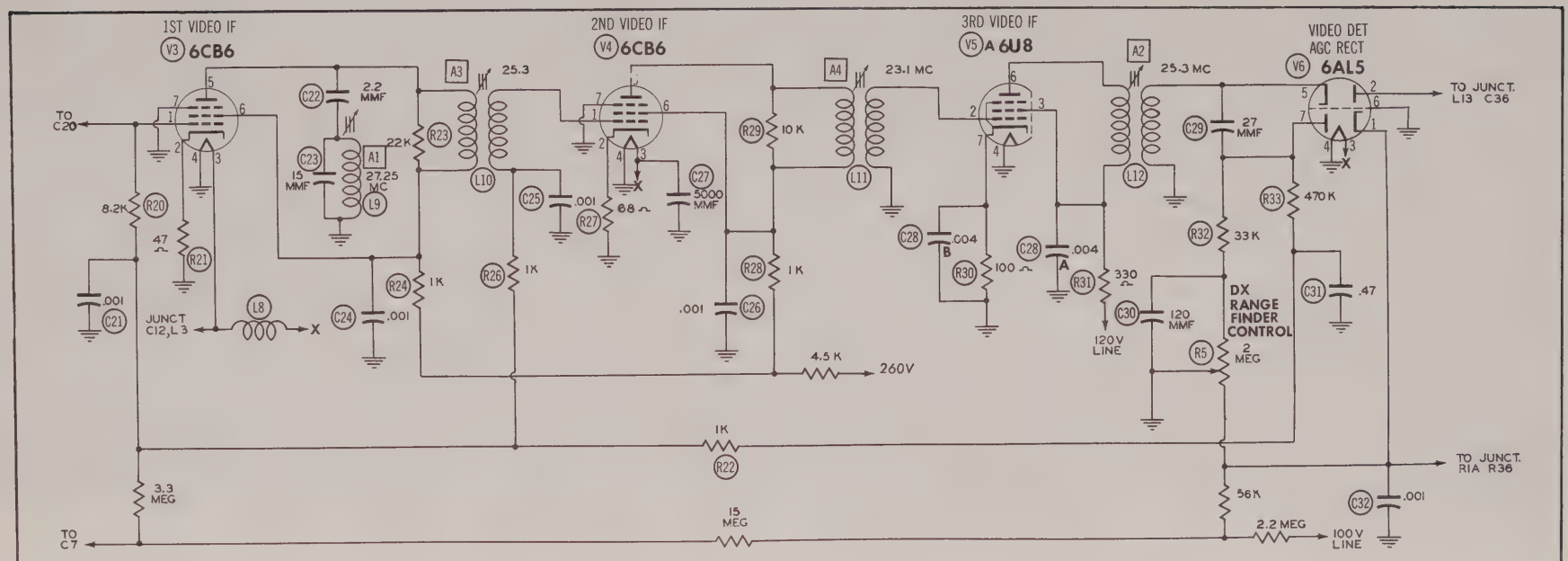

FIG. 3

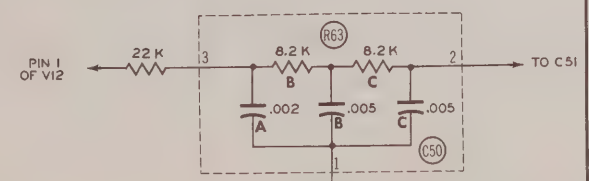

FIG. 4

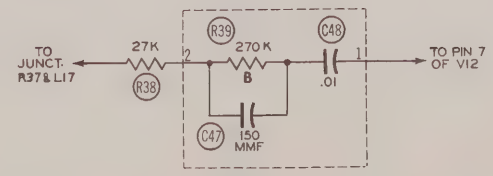

FIG. 5

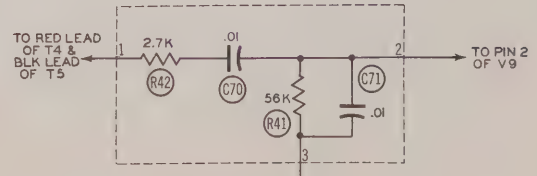

FIG. 6

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PHOTOFACT* Folder

RETMA MEMBER

CROSLEY MODELS G-21TOBH, TOBU, TOMH, TOMU, TOWH, H-21COBH, COBU, COMH, COMU, COSBH, COSH, COWH, COWU, HCBH, HCBU, HCWH, HCWU, TOBH, TOMH, TOWH (Ch. 431, 431-2)

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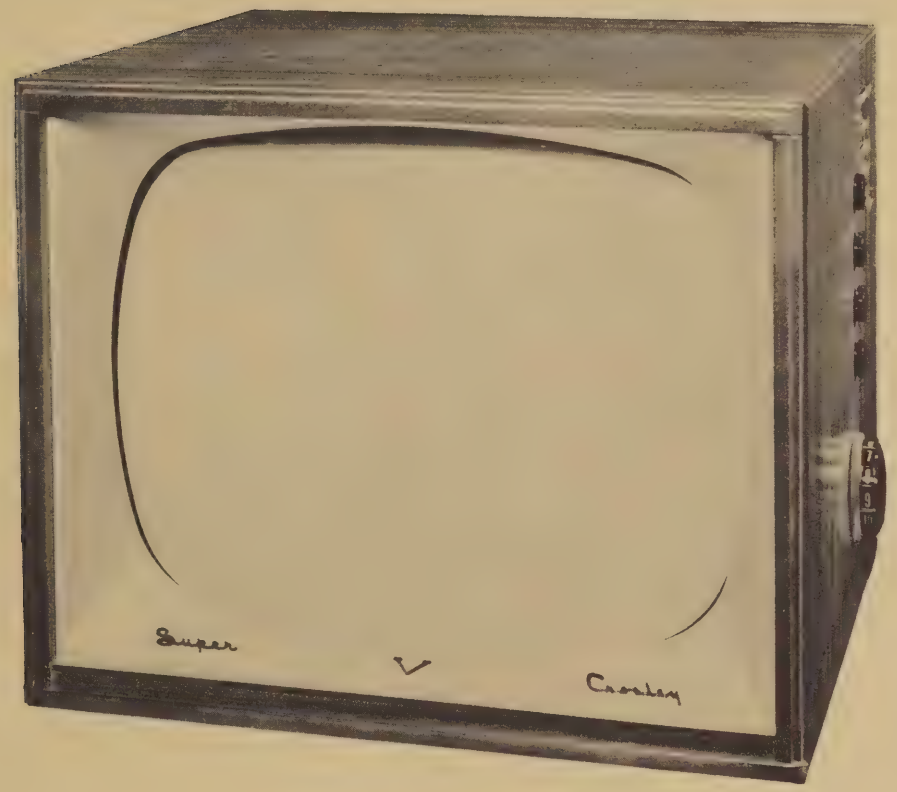

MODEL G-21TOMH

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DATE 1–55 SET 263 FOLDER 6

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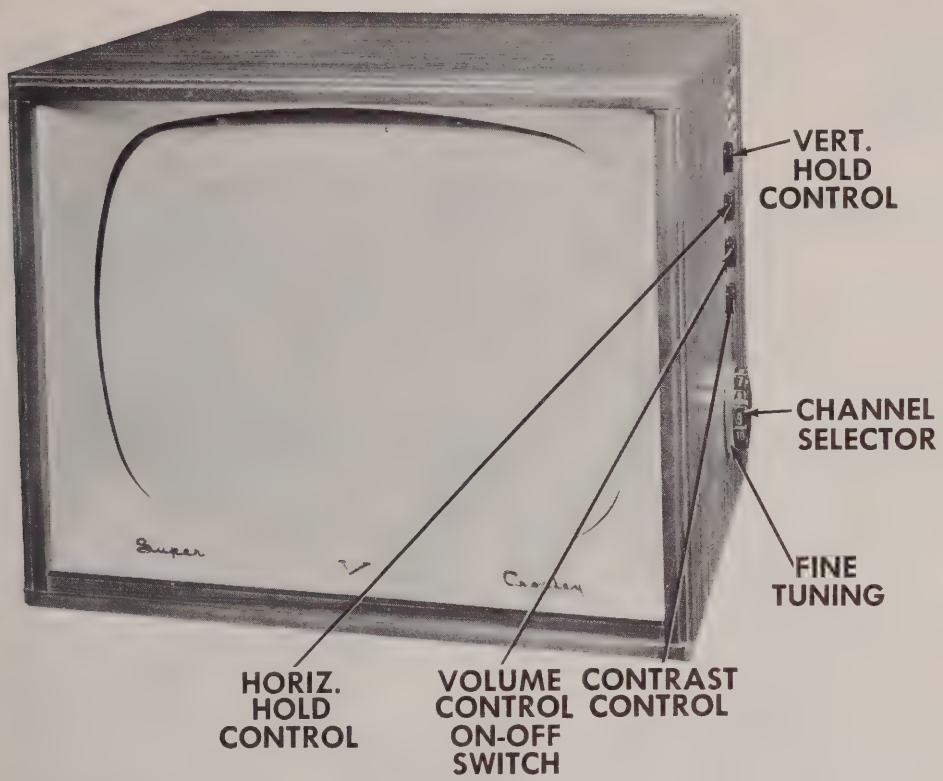
CROSLEY MODELS G-21TOBH, TOBU, TOMH, TOMU, TOWH, H-21COBH, COBU, COMH, COMU, COSBH, COSH, COWH, COWU, HCBH, HCBU, HCWH, HCWU, TOBH, TOMH, TOWH (Ch. 431, 431-2)



CROSLEY MODEL G-21TOMH

TRADE NAME	Crosley	MODELS	CHASSIS
		G-21TOBH, G-21TOBU, G-21TOMH, G-21TOMU, G-21TOWH	431
		H-21COBH, H-21COBU, H-21COMH, H-21COMU, H-21COSBH, H-21COSH, H-21COWH, H-21COWU, H-21HCBH, H-21HCBU, H-21HCWH, H-21HCWU	431-2
		H-21TOBH, H-21TOMH, H-21TOWH	431, 431-2
MANUFACTURER	Crosley Corp., 1329 Arlington St., Cincinnati, Ohio		
TYPE SET	Television Receiver		
TUBES	Fifteen		
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING 1.2 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 26.4MC, Sound IF 21.9MC (Intercarrier)		

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Tube Placement Chart (Bottom View) 8
Tube Placement Chart (Top View) 5

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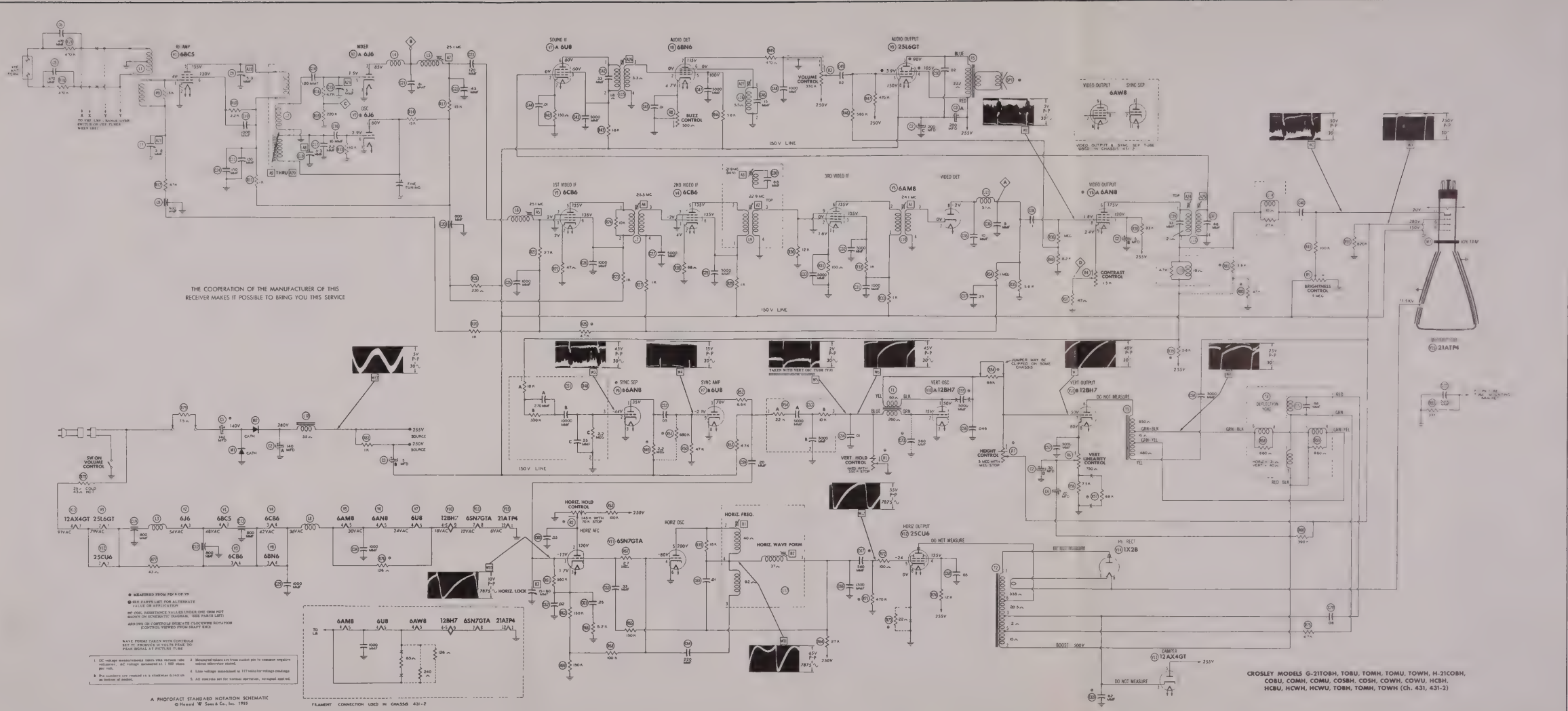
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
CROSLEY MODELS G-21TOBH, TOBU, TOMH, TOMU, TOWH, H-21COBH, COBU, COMH, COMU, COSBH, COSH, COWH, COWU, HCBH, HCBU, HCWH, HCWU, TOBH, TOMH, TOWH (Ch. 431, 431-2)
A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1955
FILAMENT CONNECTION USED IN CHASSIS 431-2
CROSLEY MODELS G-21TOBH, TOBU, TOMH, TOMU, TOWH, H-21COBH, COBU, COMH, COMU, COSBH, COSH, COWH, COWU, HCBH, HCBU, HCWH, HCWU, TOBH, TOMH, TOWH (Ch. 431, 431-2)

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CHASSIS TOP VIEW

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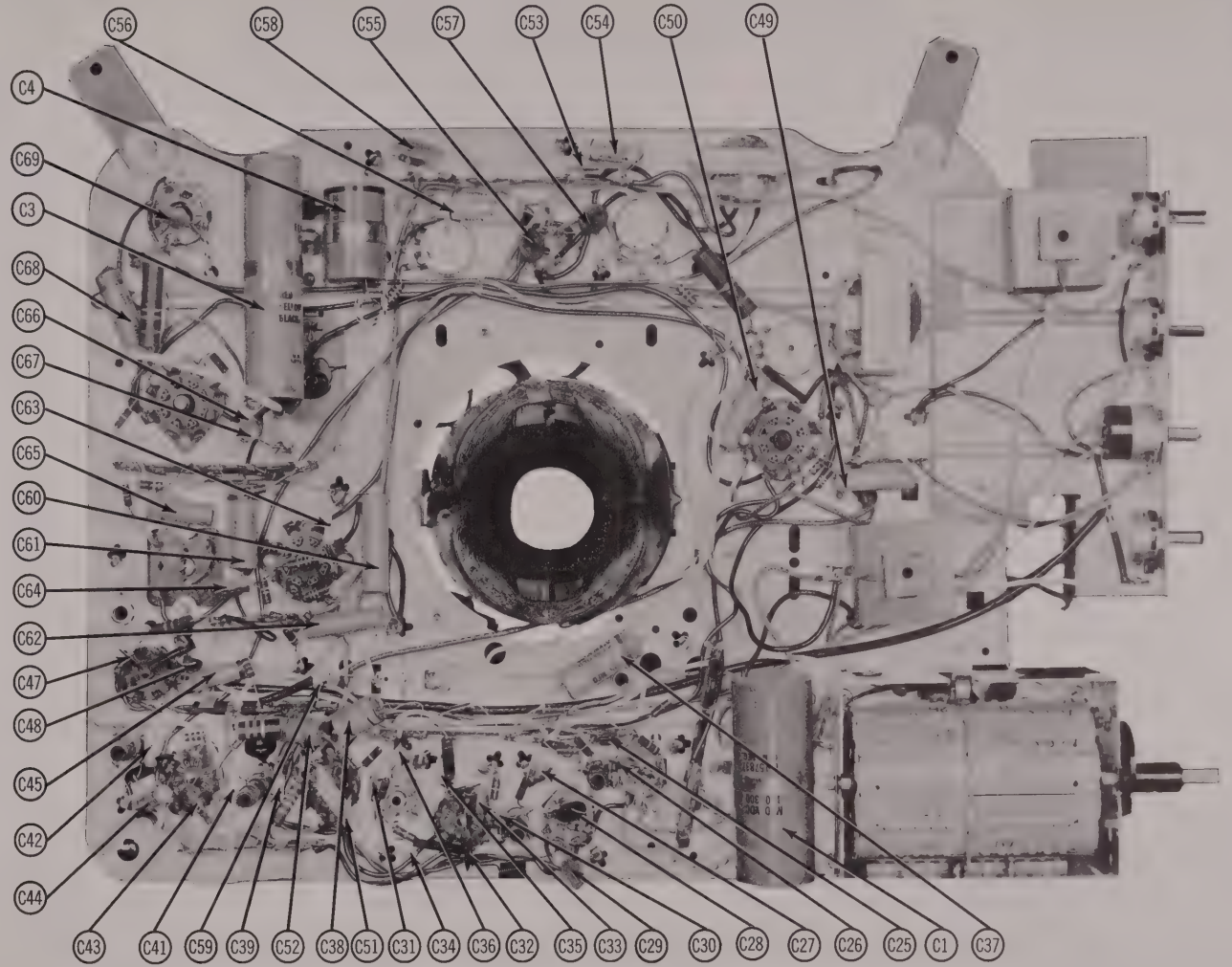

CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

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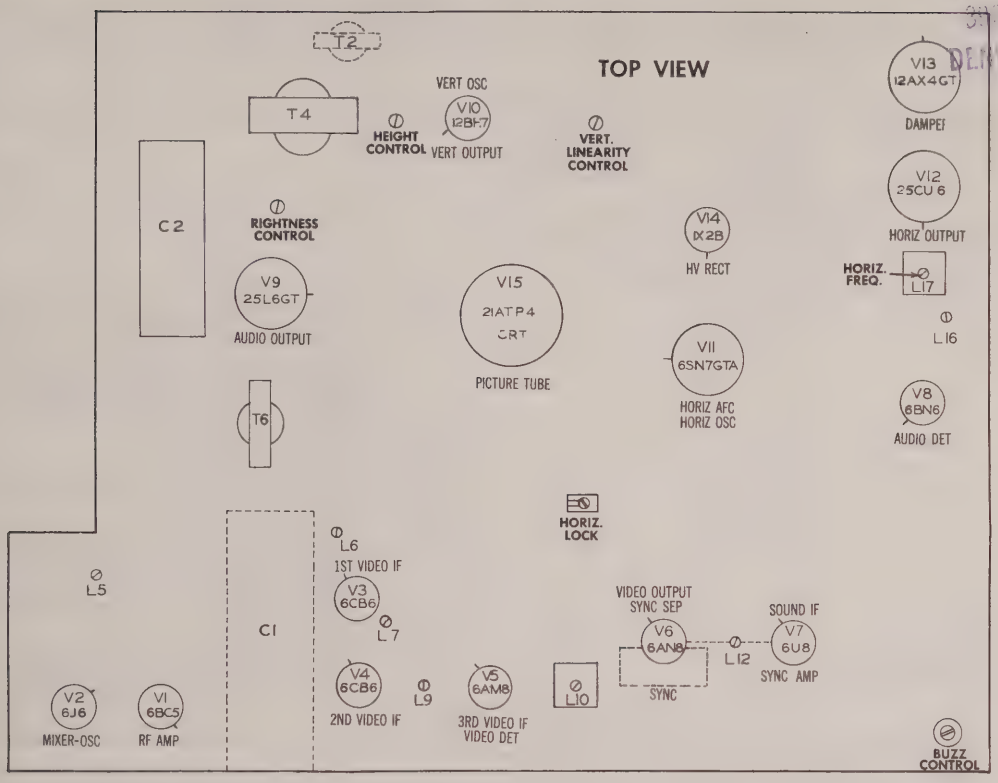
TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

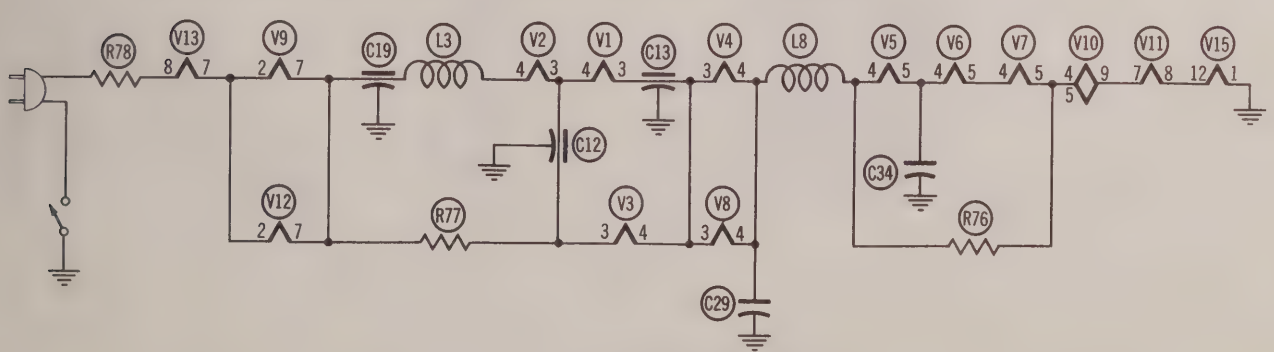
POWER SUPPLY FAILURE
No raster, no sound - **Selenium Rectifiers (M1 & M2)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6, V9**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V15**
Has pic, no sound - **V7, V8, V9**

SYNC FAILURE
No vert. sync - **V7, V10**
No horiz. sync - **V7, V11**
No vert. or horiz. sync - **V6, V7**

SWEEP FAILURE
No raster, has sound - **V11, V12, V13, V14, V15**
No vertical deflection - **V10**
Poor vert. linearity or foldover - **V10**
Poor horiz. linearity or foldover - **V11, V12, V13**
Narrow picture - **V11, V12, V13, V14, M1, M2**
Vert. off freq. - **V7, V10**
Horiz. off freq. - **V7, V11**

NOTE: Since this receiver employs tubes used in series-parallel filament network, an open filament in any tube in series may cause the set to be inoperative . (See circuit below).



CROSLEY MODELS G-21TOBH, TOBU, TOMH, TOMU, TOWH, H-21COBH, COBU, COMH, COMU, COSBH, COSH, COWH, COWU, HCBH, HCBU, HCWH, HCWU, TOBH, TOMH, TOWH (Ch. 431, 431-2)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use an isolation transformer to protect the test equipment.
The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal oscillator tube (V11) to disable the high voltage.

VIDEO IF ALIGNMENT

Turn contrast control to minimum contrast position. Connect the negative lead of a 3 volt bias battery to the tuner AGC (white) lead. Connect the positive lead to chassis.
Attenuate generator output to maintain not more than -2 volts at VTVM.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	.01MFD	High side to point Ⓑ. Low side to chassis.	24.4MC (Unmod)	Any non-interfering channel	DC probe to point Ⓐ. Common to chassis.	A1	Adjust for maximum deflection.
2.	"	"	22.9MC	"	"	A2	Adjust for maximum deflection. If two peaks occur, use the peak nearest the clip end of the coil.
3.	"	"	21.9MC	"	"	A3	Adjust for MINIMUM deflection. Use enough generator output to produce 0.5 volt deflection at minimum reading. The correct null should occur when the core is nearest the end of coil opposite the clip end. Repeat steps 2 and 3.
4.	"	"	25.5MC	"	"	A4	Adjust for maximum deflection.
5.	"	"	25.1MC	"	"	A5	Adjust for maximum deflection. Use peak nearest clip end of coil.
6.	"	"	27.9MC	"	"	A6	This trap is not used on all sets. When the trap is employed its adjustment (A6) will be the top core in the first video IF coil whose adjustment is A5. Adjust A6 for MINIMUM deflection on null that occurs when A6 is adjusted farthest counter clockwise. Repeat steps 5 and 6.
7.	Direct	High side to point Ⓒ. Low side to chassis.	25.1MC	"	"	A7	Shunt L6 with a 100Ω resistor in series with a .001MFD capacitor. Adjust A7 for maximum deflection. Remove 100Ω resistor and .001MFD capacitor from L6.

OVERALL VIDEO IF RESPONSE CHECK

Leave bias battery connected as under "Video IF Alignment". Use only enough sweep and marker generator output to provide usable indication on scope.
Remove the converter tube (V2) from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications. Set contrast control for minimum contrast.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	24MC (10MC Swp)	21.9MC 22.9MC 25.1MC 25.5MC 26.4MC	Any	Vert. Amp. thru 10KΩ to point Ⓓ. Low side to chassis.		Check for response similar to Fig. 1. If necessary, SLIGHTLY retouch A1, A2, A4, A5 and A7 to obtain desired response. Adjust A3 so that 21.9MC marker falls in center of trap notch.

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
Leave the bias battery connected as under "Video IF Alignment".
Complete oscillator alignment may not be necessary. If the oscillator seems to be off frequency approximately the same amount for a majority of the channels, it may be possible to correct them in one step using A8. (This trimmer not used in all models.)
It should be noted that this is an all channel oscillator circuit adjustment and should not be used to correct any individual channel. If adjustment of A8 will not bring all channels well within the range of the fine tuning control, it will be necessary to adjust the channel strip adjustment for each channel that is off frequency.
The channel oscillator adjustment screws are reached through a hole just below the tuner shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	57MC (10MC Swp)	55.25MC 59.75MC	2	Vert. Amp. thru 10KΩ to point Ⓓ. Low side to chassis.	A9	Adjust to place sound marker in trap notch as in Fig. 2. Video marker should fall at 40% on high frequency slope of response curve.
			63MC (10MC Swp)	61.25MC 65.75MC	3		A10	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A11	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A12	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A13	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A14	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A15	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A16	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A17	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A18	
			207MC (10MC Swp)	205.25MC 209.75MC	12		A19	
			213MC (10MC Swp)	211.25MC 215.75MC	13		A20	

ALIGNMENT INSTRUCTIONS (cont)

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RF AND MIXER ALIGNMENT

Leave bias battery connected as under "Video IF Alignment" but reduce the bias from -3 volts to -1.5 volts.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	Not used	195.5MC (400∿Mod)	10	Vert. Amp. thru 10KΩ to point Ⓒ. Low side to chassis.	A21	Adjust for maximum 400∿ indication on scope.
11.	"	"	195MC (10MC Swp)	193.25MC 197.75MC	10	"	A22,A23	Adjust for response similar to Fig. 3.
12.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response similar to Fig.3 on all channels. If markers fall below 70% on any channel make compromise adjustments of A21, A22 and A23 with channel switch set to that channel. Check all other channels to see that they have not been seriously affected.
			207MC (10MC Swp)	205.25MC 209.75MC	12			
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13.	.01MFD	High side to pin 8 (grid) of 6AN8 (V6). Low side to chassis.	Not used	4.5MC (400∿Mod)	Any non-interfering channel	Vert. Amp. thru detector (Fig.4) to pin 11 (cathode) of picture tube.	A24	Adjust for MINIMUM 400∿ indication on scope.

SOUND IF SIGNAL USING ON THE AIR SIGNAL

Remove the bias battery. Turn set on and tune in a strong TV signal. Turn the buzz control (R8) 90 degrees from maximum clockwise rotation. Adjust A27 for maximum volume. Reduce the signal strength into the receiver by inserting an attenuator in series with the antenna and receiver antenna terminals. If a suitable attenuator is not available, remove the antenna from the antenna terminals and stray feed the signal into the receiver by placing the antenna near the antenna terminals. Adjust A25 and A26 for maximum volume. Adjust R8 for minimum noise. Reconnect antenna and readjust A27 for maximum volume. If necessary, reduce volume so that this peak can be heard.

ALTERNATE SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR, AM SIGNAL GENERATOR AND OSCILLOSCOPE

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Set volume control at low volume level.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
14.	.01MFD	High side to pin 8 (grid) of 6AN8 (V6). Low side to chassis.	4.5MC (400∿Mod) 50KC Swp)	4.5MC	Any non-interfering channel	Across secondary of T6.	A27	Set buzz control (R8) 90 degrees from maximum clockwise rotation. Adjust A27 for maximum 400∿ indication on scope.
15.	"	"	"	"	"	"	A26,A25	Attenuate generator output so that signal level is below the limiting level of the 6BN6 as evidenced by background hiss and noise. Adjust A26 and A25 for maximum response on scope.
16.	"	"	Not used	4.5MC (400∿Mod)	"	"	R8	Use high signal generator output and adjust R8 for MINIMUM 400∿ indication on scope.
17.	"	"	4.5MC (400∿Mod) 50KC Swp)	4.5MC	"	"	A27	With volume control at low level retouch A27 for maximum 400∿ indication on scope.

UHF TUNER ADJUSTMENT

The UHF portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion is not recommended in the field.

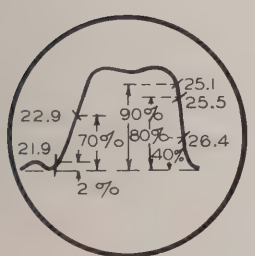


FIG.1

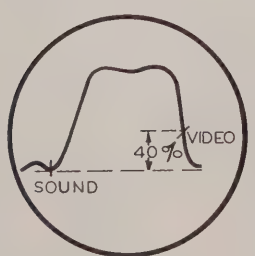


FIG.2

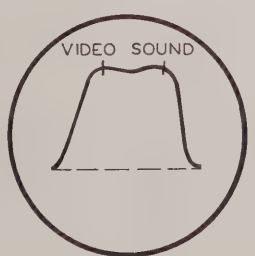


FIG.3

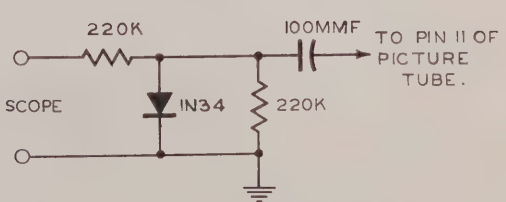
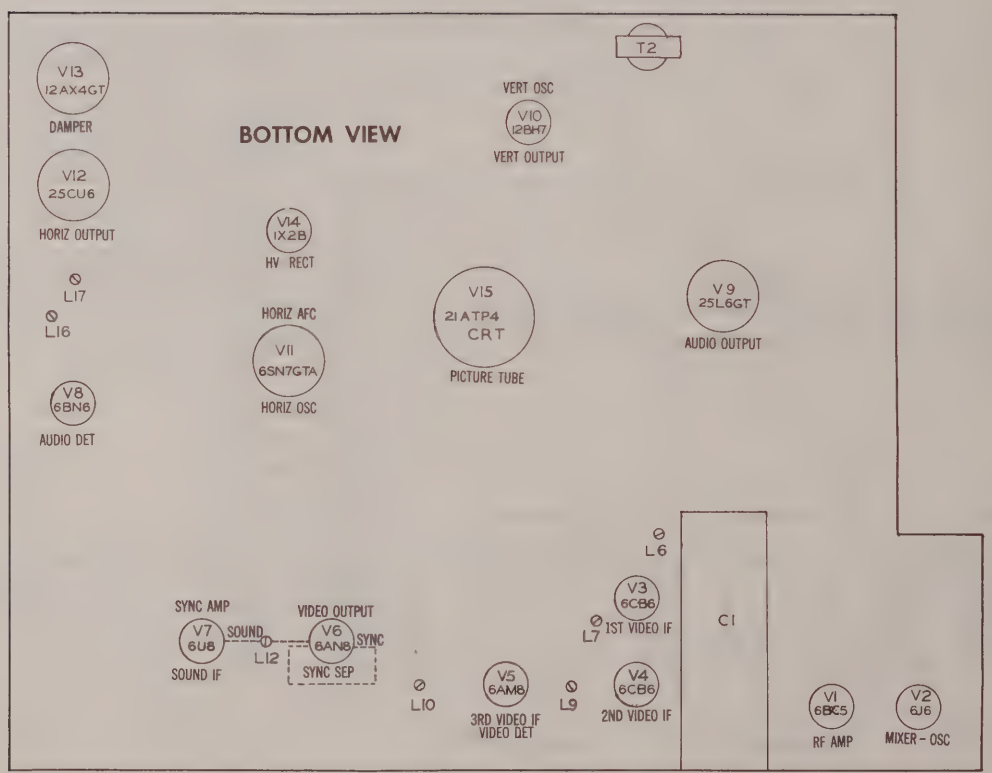


FIG.4

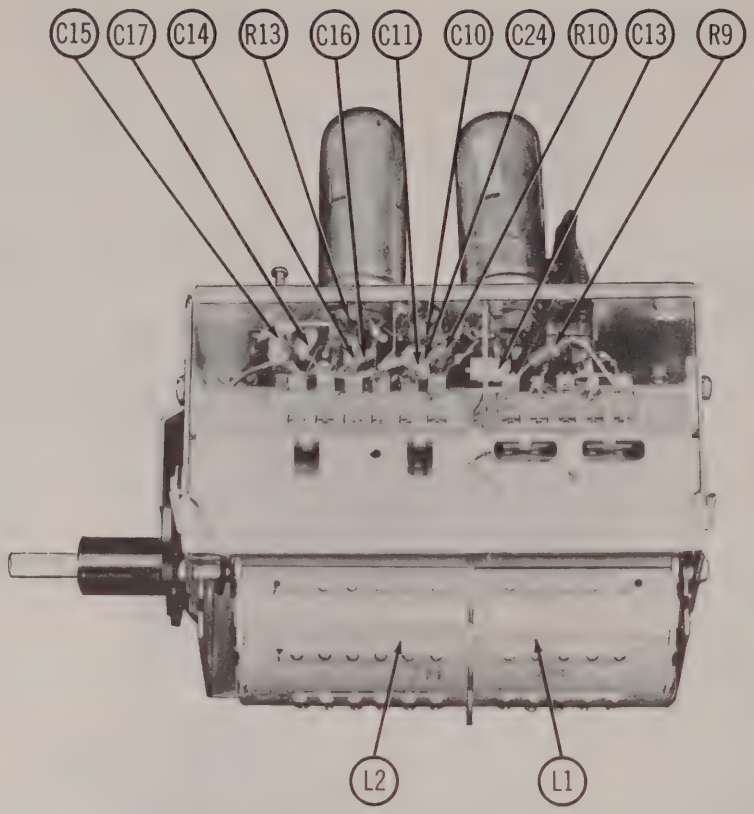
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BC5	1Meg	0Ω	14Ω	18Ω	■1.2KΩ	■3.4KΩ	0Ω		
V 2	6J6	■15.2KΩ	■15.2KΩ	18Ω	20Ω	225KΩ	10KΩ	0Ω		
V 3	6CB6	1Meg	47Ω	18Ω	16Ω	■1.2KΩ	■1.2KΩ	0Ω		
V 4	6CB6	1Meg	68Ω	16Ω	14Ω	■1KΩ	■1KΩ	0Ω		
V 5	6AM8	100Ω	.4Ω	■2KΩ	14Ω	12Ω	■1KΩ	.3Ω	5.6KΩ	0Ω
V 6	6AN8	■2.2Meg	2.2Meg	0Ω	12Ω	10Ω	†5.6KΩ	†33KΩ	1Meg	160Ω
V 7	6U8	■11.5KΩ	.9Ω	■18KΩ	10Ω	8Ω	■18KΩ	150Ω	0Ω	47KΩ
V 8	6BN6	500Ω	3.3Ω	16Ω	14Ω	■5.6KΩ	5.5Ω	†330KΩ		
V 9	25L6GT	INF	25Ω	†277Ω	†55Ω	250KΩ	8.2KΩ	20Ω	120KΩ	
V 10	12BH7	▲2.4Meg	580KΩ.	0Ω	8Ω	8Ω	▲1KΩ	▲2.4Meg	8KΩ	6Ω
V 11	6SN7GTA	750KΩ	†100KΩ	300KΩ	250KΩ	†28KΩ	0Ω	6Ω	4Ω	
V 12	25CU6	INF	25Ω	†0Ω	†12KΩ	470KΩ	470KΩ	20Ω	0Ω	TOP CAP ▲20Ω
V 13	12AX4GT	INF	INF	700KΩ	INF	†55Ω	0Ω	25Ω	30Ω	
V 14	1X2B		PINS	1 - 8	HAVE	INF	RESISTANCE			TOP CAP ▲355Ω
V 15	21ATP4	0Ω	0Ω	PIN 6 ■0Ω	PIN 10 ▲390KΩ	PIN 11 ■250KΩ	PIN 12 4Ω			

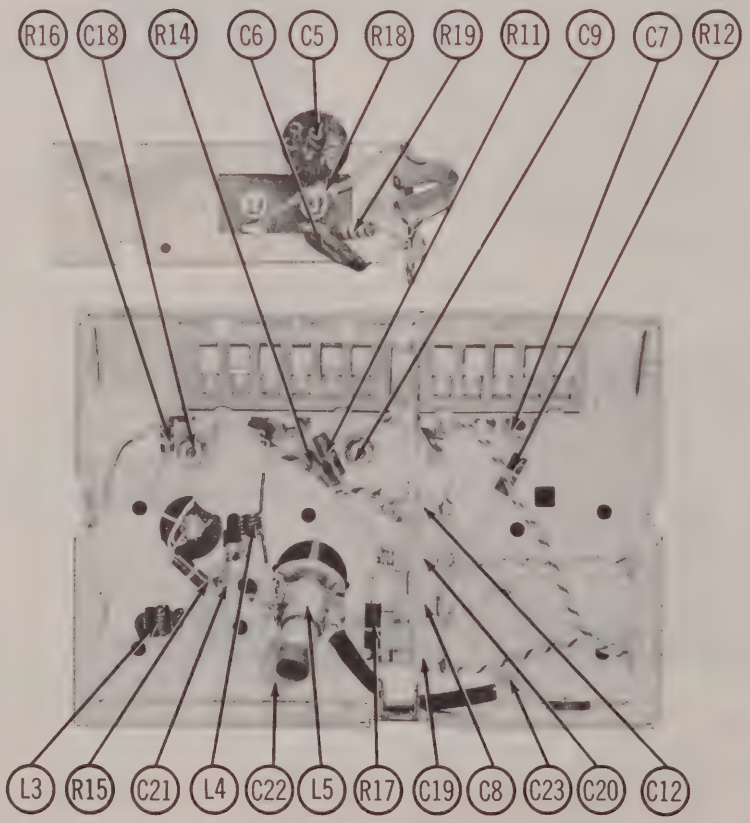
■ MEASURED FROM 150V LINE
† MEASURED FROM OUTPUT OF M2.
▲ MEASURED FROM PIN 3 OF V13



TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW

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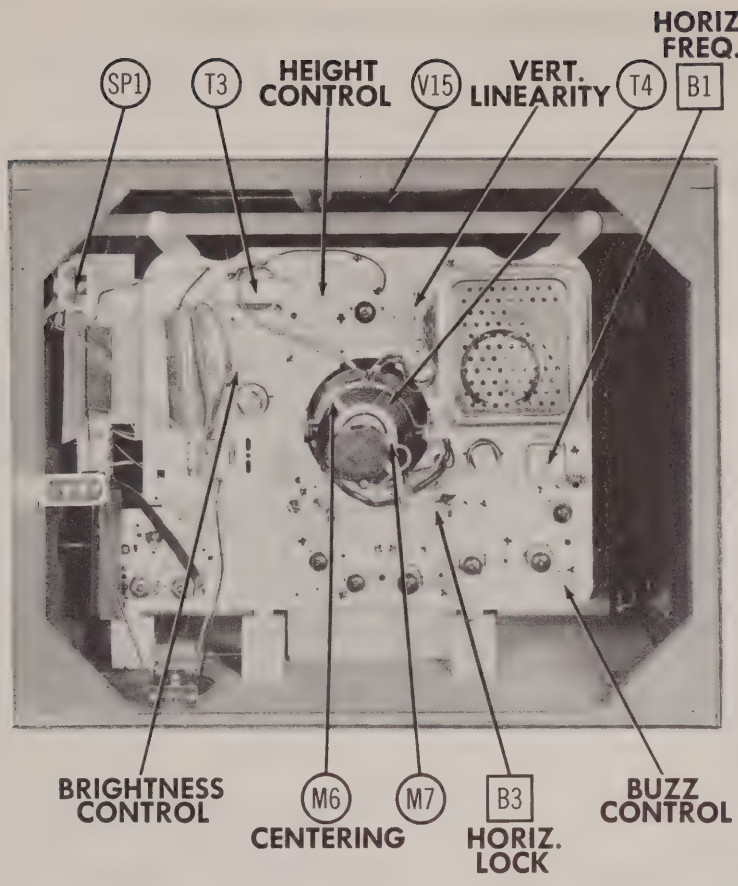

CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn set on and tune in a TV station, preferably a test pattern.

Set the contrast control for normal contrast.

1. Set the horizontal hold control to its mid-range position and adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.
2. Connect the vertical amplifier of the oscilloscope through 10MMFD to lug 4 of L17. Low side to chassis. Adjust the horizontal waveform slug (B2) until waveform similar to Fig. 5 is obtained. While making this adjustment keep the picture in sync with the horizontal hold and if necessary, B1 and the horizontal lock trimmer (B3).
3. Turn the horizontal hold control fully clockwise. Turn B1 counter clockwise until the picture just loses sync, then turn B1 clockwise until picture is just ready to pull into sync.
4. Turn the horizontal hold control fully counter clockwise. Picture should remain in sync.

Momentarily remove signal by switching off channel and back again. If more than 7 diagonal bars are present, adjust the horizontal lock trimmer (B3) slightly counter clockwise until 3 or 4 diagonal bars appear when switching off channel and back again. If less than 3 bars are present when switching off channel and back again, adjust B3 slightly clockwise until 3 or 4 bars are present when switching off channel and back again. Repeat steps 3 and 4 until the effective pull-in range of the horizontal hold control is from 60 to 120 degrees.

5. In weak signal areas the horizontal hold control should be adjusted so that when switching on and off channel the picture returns completely in sync.

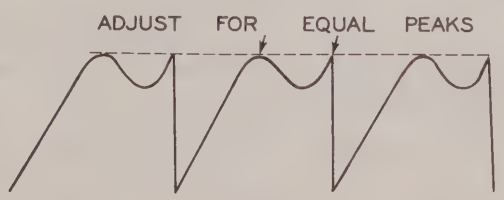

FIG. 5

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V12 and V13. Check M1 and M2. Check T2, T4A, C67, C66, R74 and other associated components.

DRIVE LINES

Check by substitution V12 and V13. Check C66, C67, C69, R74, T2, T4A and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V12 and V13. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V11, V12 and V13. Check C62 for open. Check L17, R63, C60, C63 and other associated components.

XMAS TREE EFFECT

Check by substitution V11, V12 and V13. Check T2 and T4A for internal arcing. Check L17, C65, C61, R70, R63, R66 and other associated components.

VERTICAL

LOSS OF SWEEP

Substitute V10. Check waveform W7.

If Satisfactory	If Unsatisfactory
Check T3, T4B, C57, C2D, C4, R56, R57, R6 and other associated components.	Check T1, R60, R7, C56 and other associated components.

INSUFFICIENT SWEEP

Substitute V10. Check height and vertical linearity controls for proper operation. Check T3 and T4B. Check C4, C2D, R56, R57 and other components associated with V10.

COMPRESSED AT BOTTOM

Substitute V10. Check R7, R60, C56 and other associated components.

COMPRESSED AT TOP

Substitute V10. Check R6, R56, R57, C4 and other associated components.

FOLDS

Substitute V10. Check C56, C58, R55 and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V6 and V7. Check C51A, C51B, C51C, C52, R49, R52 and other associated components.

LOSS OF VERTICAL SYNC - HORIZONTAL SYNC SATISFACTORY

Substitute V10. Check T1, R1 and C54. Check vertical integrator network.

LOSS OF HORIZONTAL SYNC - VERTICAL SYNC SATISFACTORY

Substitute V11. Check adjustments B1, B2 and B3. Check C59, C62, R63, R2 and other associated components.

HORIZONTAL BENDING

Check by substitution V6, V7 and V11. Check horizontal AFC network.

VIDEO

LOSS OF VIDEO

Substitute V6. Check C38, C40, L14, L13, R39, R38 and other associated components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check adjustment A24. Check video IF alignment.

POOR CONTRAST

Substitute V6. Check contrast control, picture tube and video detector network. Check R37, C38, C40 and other associated components.

NEGATIVE PICTURE

Substitute V6. Check video detector network. Check picture tube. Check L13, L14, C40 and other associated components.

SMEAR

Substitute V6. Check L11, L13, L14, and C38. Check video IF Alignment.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V5 and V6 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V7, V8 and V9. Check stage V9 using audio signal generator. Apply audio signal across C48.

If Satisfactory	If Unsatisfactory
Check audio detector and audio IF stages for component failure or change of value.	Check C48, C49, C50, R47, T5, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustments R8 and A27. If still unsatisfactory, check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

POWER

DEAD SET

If filaments fail to light, check all tubes. The filaments are connected in series. If tubes are good, check AC interlock assembly and R78. If filaments light, check R79, switch on volume control and C1. Check M1 and M2. Check B+ filter and decoupling network.

SMALL AND/OR DIM PICTURE

Check R79. Check M1 and M2. Check B+ filter and decoupling network.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: CROSLEY PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	6BC5	6BC5	7BD	
V2	Mixer - Osc.	6J6	6J6	7BF	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp. - Video Detector	6AM8	6AM8	9CY	
V6	Video Output - Sync Separator	6AN8	6AN8	9DA	Ch. 431-2 uses a 6AW8 in this application
V7	Sound IF Amp. - Sync Amp.	6U8	6U8	9AE	
V8	Audio Detector	6BN6	6BN6	7DF	
V9	Audio Output	25L6GT	25L6GT	7S	
V10	Vert. Oscillator - Vert. Output	12BH7	12BH7	9A	
V11	Horiz. AFC - Horiz. Osc.	6SN7GTA	6SN7GTA	8BD	
V12	Horiz. Output	25CU6	25CU6	6AM	
V13	Damper	12AX4GT	12AX4GT	4CG	
V14	HV Rectifier	1X2B	1X2B	9Y	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: CROSLEY PART No.	CBS-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V15	21ATP4	21ATP4		21ATP4	21ATP4	12L	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: CROSLEY PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1	140	150	157837-1	AFHS1-70		E210400		FP117	TVL-1428	Red-Note 1
C2A	140	300	157838-2	E58C76		E210401			TVL-4563	Red
B	5	200								Blue
C	200	150								Green
D	30	150								Yellow
C3A	200	150	157836-1	AFHS2-109		E210399		FP216.1	TVL-2444	Red
B	5	150								Yellow
C4	20	450	157903-1	PRS450/20		BR2045		TC75	TVA-1709	
C5	470	2000	156201-1	HVD20-471	DD30-471		3KV-471	MCL-347	20GA-T47	
C6	470	2000	156201-1	HVD20-471	DD30-471		3KV-471	MCL-347	20GA-T47	
C7	3-8		156906-16		829-10					
C8	800		158106-8	EF-001	MFT-1000				503C-D1	
C9	.5-3		156906-5		829-3		3115-01-0R5	CT565A		
C10	1000		158106-1	BPD-001	DD-102	K069	801-001	CC-521	5HK-D1	
C11	150		158106-2	BPD-151	D6-151	G046	811-151	UC-5315	5GA-T15	
C12	800		158106-8	EF-001	MFT-1000				503C-D1	
C13	800		158106-8	EF-001	MFT-1000				503C-D1	
C14	120		158106-3	BPD-121	D6-121	G044	811-121	UC-5312	5GA-T12	
C15	.5-3		156906-5		829-3		3115-01-0R5	CT565A		
C16	10		158106-6							
C17	2.2		158106-5							
C18	.5-3		156906-5		829-3		3115-01-0R5	CT565A		
C19	800		158106-8	EF-001	MFT-1000				503C-D1	
C20	800		158106-8	EF-001	MFT-1000				503C-D1	
C21	82		158106-15	SI82	D6-820	G040	GP1K-820		5GA-Q82	
C22	43		158106-16		TCZ-43	TZ21	NP0K-430			
C23	120		158106-3	BPD-121	D6-121	G044	811-121	UC-5312	5GA-T12	
C24	150		158106-2	BPD-151	D6-151	G046	811-151	UC-5315	5GA-T15	
C25	1000		144675-28	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C26	1000		144675-28	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C27	5000		144675-2	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C28	5000		144675-2	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C29	1000		144675-28	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C30	68	500	137499-33	1469-680	TCZ-68	22R5Q68	NP0-337-680	ZT-5468	MS-47	
C31	1000		144675-28	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C32	5000		144675-2	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C33	5000		144675-2	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C34	1000		144675-28	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C35	10		137727-135	SI10NP0	TCZ-10	TZ09	NP0A-100	ZT-541	5TCC-Q1	
C36	5		137727-103							
C37	.25	25	157810-1	P185-25		CUB2P25		PT4025	68P19	
C38	.1	150	157906-1	P288-1	DF-104	CUB2P1		PT401	2TM-P1	
C39	33		137727-126	SI33N080			N080L-330			
C40	.1	400	39478-47	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C41	68		137727-133	SI68N080			N080M-680			
C42	33		137727-126	SI33N080			N080L-330			
C43	5000		144675-2	BPD-005	DD-503	K080	811-005	DC-525	5HK-D5	
C44	.01	200	39478-41	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C45	.01	200	39478-41	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C46	15		137727-43	SI15N080			N080K-150			
C47	5000		144675-2	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C48	1000		144675-28	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C49	.02	200	39001-80	P488-02	DF-203	CUB4S2	817-02	PT412	4TM-S2	
C50	.02	200	39001-80	P488-02	DF-203	CUB4S2	817-02	PT412	4TM-S2	
C51A	270					TP41	GP2K-271	UC-5327		
B	10000		♦157813-1	♦PA-228	♦PC-260	K082	811-01	DC-511	♦102C17	
C	25					TP25	GP1K-250	UC-5425		
C52	.05	200	39001-17	P288-05	DF-503	CUB2S5		PT415	2TM-S5	
C53A	5000		*157812-1	*PA-221	*PC-106	K080	811-005	DC-525	5HK-D5	
B	5000					K080	811-005	DC-525	5HK-D5	
C54	.01	400	39478-41	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C55	5000		144675-2	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	Note 2
C56	.047	400	39477-45	P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C57	5000		144675-2	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C58	5000		158215-25	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C59	20		137727-61							
C60	.05	400	39001-17	P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C61	.25	25	157810-1	P185-25		CUB2P25		PT4025	68P19	
C62	.02	200	39001-80	P488-02	DF-203	CUB4S2	817-02	PT412	4TM-S2	

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA CROSLEY Part No.	AEROVOX Part No.	CENTRALAB Part No.	CORNELL-DUBILIER Part No.	ERIE Part No.	MALLORY Part No.	SPRAGUE Part No.	NOTES
C63	33		137727-126	SI33N080			N080L-330			
C64	220	500	137498-22	1469-221		SR5Z23		MC B340		
C65	.01	400	146813-2	P488-01	D6-103	CUB4B1	GP3-333-103	PT4U	47M-S1	
C66	1300		144675-33							
C67	560			BPD-561	D6-561		GP3K-561	UC-3356	5GA-T56	Note 3
C68	.03	400	39001-17	P488-03	DF-303	CUB4B5		PT4S	47M-S5	
C69	82	3000								Note 4
C70	.08	600	39001-85							
C71	68	3000	158215-3		DD30-680		3KV-680		30GA-Q68	
C72	5000	2000								
C73	560	3000	144675-32							Note 5

Note 1. Some versions may use a 3000MFD capacitor in this application (part #158557-1).
Note 2. Used only in Ch. 431, code A, B, C
Note 3. Some versions may use a 1300MMF in this application.
Note 4. Some versions may use a 68MMF ⓖ 300V in this application.
Note 5. Used only in Ch. 431-3 and 431, Code D and later.
* Items C51A, C51B, C51C, R48A, R48B, R48C are combined in one unit.
* Items C53A, C53B, R54A, R54B are combined in one unit.

CONTROLS

ITEM No.	RATING RESIST-ANCE	RATING WATTS	REPLACEMENT DATA CROSLEY Part No.	IRC Part No.	CLAROSTAT Part No.	CENTRALAB Part No.	MALLORY Part No.	INSTALLATION NOTES
R1A	1Meg with 350KΩ stop	½	B157805-1-3	Qil-136	A47-750K-S	B-59	U-54	Vert. hold - Note 1
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
R2A	145KΩ with 70KΩ stop	½	B157803-1-3	Qil-125	A47-75K-S	B-35	U-41	Horiz. hold - Note 2
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A
R3A	330KΩ	½	B157805-1-2	Qi3-132	A47-500K-Z	B-60-S	U-48	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R3A
C	Switch		Not Req.	76-1	SWE-13	Not Req.	U8-26	Attach to R3A
R4A	150KΩ	½	B157804-1-2	Qi7-109	A47-150K-S	AB-515	U-5	Contrast
B	Shaft		Not Req.	Not Req.	FS-3	AE-3	Not Req.	Attach to R4A
R5A	5Meg	½	B157801-1-2	Qi7-141	A47-5Meg-S		U-67	Brightness
B	Shaft		158188 *	Not Req.	FK3-1/4		Not Req.	Attach to R5A
R6A	750Ω	½	B157800-1-1	Qil-105	A47-750-S	AB-5	U-4	Vert. linearity
B	Shaft		Not Req.	8Q	K38-3	AK-1	Not Req.	Attach to R6A
R7A	5Meg with 1Meg stop	½	B157801-1-1	Qil-141	A47-4Meg-S	AB-47	SU-67	Height - Note 3
B	Shaft		Not Req.	8Q	FK3-1/4	AK-1	Not Req.	Attach to R7A
R8	500Ω	1	B157955-2-1		39-500			Buss Wire Wound

* Brightness control, shaft extension.
Note 1: Connect a 330KΩ resistor in series with the left hand terminal of the control and the lead connecting to the same terminal of the original control. (Control viewed from shaft end, terminals down.)
Note 2: Connect a 68KΩ resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control. (Control viewed from shaft end, terminals down.)
Note 3: Connect a 1Meg resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control. (Control viewed from shaft end, terminals down.)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA CROSLEY Part No.	IRC Part No.	NOTES
R9	15KΩ	1	158106-9	BTS-15K	
R10	2200Ω	1	39374-29	BTS-2200	
R11	100KΩ	1	39374-35	BTS-100K	
R12	47KΩ	1	39374-45	BTS-47K	
R13	10KΩ	1	39374-37	BTS-10K	
R14	15KΩ	1	39374-39	BTS-15K	
R15	220KΩ	1	39374-53	BTS-220K	
R16	470KΩ	1	158106-10	BTS-470K	
R17	15KΩ	1	39374-39	BTS-15K	
R18	470KΩ	1	39374-57	BTS-470K	
R19	470KΩ	½	39374-57	BTS-470K	
R20	1000Ω	½	39374-25	BTS-1000	
R21	2700Ω	½	39374-30	BTS-2700	
R22	47Ω	½	39374-9	BTS-47	
R23	1000Ω	½	39374-25	BTS-1000	
R24	10KΩ	½	39374-37	BTS-10K	
R25	4700Ω	½	39374-33	BTS-4700	Note 1
R26	220Ω	½	39374-53	BTS-220	
R27	1000Ω	½	39374-25	BTS-1000	
R28	68Ω	½	39374-41	BTS-68	
R29	1000Ω	½	39374-25	BTS-1000	
R30	12KΩ	½	39374-38	BTS-12K	
R31	100Ω	½	39374-13	BTS-100	
R32	1000Ω	½	39374-25	BTS-1000	
R33	1000Ω	½	39374-25	BTS-1000	
R34	1Meg	½	39374-61	BTS-1Meg	
R35	5600Ω	½	39374-34	BTS-5600	
R36	1Meg	½	39374-61	BTS-1Meg	
R37	47Ω	½	39374-9	BTS-47	
R38	33KΩ	1	39374-131	BTA-33K	
R39	5600Ω	3	39374-210	BTS-5600	Note 5
R40	8300Ω	½	39374-36	BTS-8200	
R41	100KΩ	½	39374-49	BTS-100K	
R42	150Ω	½	39374-15	BTS-150	
R43	18KΩ	½	39374-40	BTS-18K	
R44	5600Ω	½	39374-123	BTA-5600	
R45	47Ω	½	39374-57	BTS-470	
R46	560KΩ	½	39374-58	BTS-560K	
R47	470KΩ	½	39374-57	BTS-470K	
R48A	10KΩ	½		BTS-10K	
B	330KΩ	½	*157813-1	BTS-330K	
C	2.2Meg	½		BTS-2.2Meg	
R48	2.2Meg	½	39374-65	BTS-2.2Meg	Note 6
R50	47KΩ	½	39374-45	BTS-47K	
R51	680KΩ	½	39374-59	BTS-680K	Note 2
R52	6800Ω	½	39374-35	BTS-6800	
R53	4700Ω	½	39374-33	BTS-4700	
R54A	33KΩ	½	*157812-1	BTS-22K	
B	10KΩ	½		BTS-10K	
R55	820KΩ	½	39374-60	BTS-820K	
R56	75000Ω	2	156911-4		
R57	68KΩ	½	39374-47	BTS-68K	Note 9
R58	680Ω	½	39374-33	BTS-680	
R59	8200Ω	½	39374-33	BTS-8200	
R60	390KΩ	½	39374-56	BTS-390K	
R61	560KΩ	½	39374-58	BTS-560K	
R62	150KΩ	½	39374-51	BTS-150K	
R63	100KΩ	½	39374-49	BTS-100K	
R64	27KΩ	½	39374-42	BTS-27K	
R65	150KΩ	½	39374-51	BTS-150K	
R66	8200Ω	½	39374-36	BTS-8200	
R67	2.7Meg	½	39374-131	BTS-2.7Meg	
R68	100KΩ	½	39374-49	BTS-100K	
R69	150KΩ	½	39374-51	BTS-150K	
R70	18KΩ	½	39374-40	BTS-18K	
R71	470KΩ	½	39374-57	BTS-470K	
R72	100Ω	½	39374-13	BTS-100	
R73	22Ω	½		BTS-22	Note 3
R74	12KΩ	2	156911-5		
R75	4700Ω	½	39374-33	BTS-4700	
R76	12ΩΩ	10	158230-1		Note 8
R77	43Ω	5	158230-2		
R78	*	10	157949-1		Note 4
R79	7.5Ω	10	154089-1		Note 4
R80	47KΩ	½		BTS-47K	Note 4
R81	3900Ω	½		BTS-3900	Note 4

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA CROSLEY Part No.	IRC Part No.	NOTES
R82	1000Ω	½	39374-25	BTS-1000	
R83	33KΩ	1		BTA 33K	

Note 1: Some versions may use a 3900Ω resistor in this application.
Note 2: Not used in all versions.
Note 3: Used only in versions previous to code B.
Note 4: Some versions may use a 47KΩ resistor in this application (pin 2 of sync take off network to grid).
When this resistor is used, a 3900Ω, ½ watt resistor is added in parallel with L13.
Note 5: Chassis 431-2 uses a 5600Ω, 3 watt resistor in this application.
Note 6: Chassis 431-2, 431, code C and later use a 1Meg resistor in this application.
Note 7: Used only in chassis 431-2, and 431 code B and later.
Note 8: Chassis 431-2 uses a 85Ω resistor in this application. Some versions of 431-2 may use a 240Ω and a 126Ω resistor in parallel in this application.
Note 9: Not used in chassis 431-2.
* Items R48A, R48B, R48C, C51A, C51B and C51C are combined in one unit.
* Items R54A, R54B, C53A, C53B are combined in one unit.
† Tube Saver Resistor 125Ω at room temperature, resistance drops to 43Ω when tube heats up.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA CROSLEY Part No.	Stancor Part No.	Merit Part No.	Triad Part No.	RCA TYPE No.	Halldorson Part No.	Thordarson Part No.
T1	Vert. Osc. Trans.	155235-3	A-8135	A-3003	A-9IX		B6703	34A87 ①
T2	Horiz. Output Trans.	158681-1 ① 158681-2 ②	A-8241 *				FB418 *	F1X-25 *
T3	Vert. Output Trans.	158677-1 158726-1 ⑦						
T4A	Yoke-Horiz. (30MH)	158676-1					DF607 ⑩⑪	Y-16 ⑩ ⑪
B	Vert. (40MH)	155586-1 ④						

① Drill one new mounting hole.
② Includes high voltage coil part #158683-1, Iron core part #158473-1 and R75.
③ Alternate horizontal output transformer.
④ Rear cover and positioning device.
⑩ Connect as in original circuit.
⑪ Use original rear cover and positioning device.
⑦ Alternate vertical output transformer used in Ch. 431-2 and Ch. 431, Code D and later.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type is Listed

ORIGINAL TERMINAL CONNECTIONS	Stancor Replacement Connections	Merit Replacement Connections	Triad Replacement Connections	RCA Replacement Connections	Halldorson Replacement Connections	Thordarson Replacement Connections
7	Plate Lead				Plate Lead	7
6	3				6	6
3	1				3	3
5	See Note ⑤				5	5
2	2				8	2

⑤ Remove green lead from yoke and connect R75 in series with C71 across terminals #1 and #2 or #7 of yoke.

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE PRI	IMPEDANCE SEC	REPLACEMENT DATA CROSLEY Part No.	Stancor Part No	Merit Part No.	Triad Part No.	Halldorson Part No.	Thordarson Part No.	NOTES
T5	2.2KΩ	3.7Ω	B-157919-1-1	A-3332	A-3025	S-12X	Z1U01	28S58	

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA CROSLEY Part No.	JENSEN Part No.	QUAM Part No.	NOTES
SP1	4"	PM	3.7Ω	C-157898-1-2	8T-13 Mod. P4-X	4A07	① Used in models H-21COBH, H-21COBU, H-21CMH, H-21COMU, H-21CWH and H-21COWU
	8"	PM	3.7Ω	158832-1 ①	8T-11S Mod. P8-V	8A21	② Used in models H-21HCBH, H-21HCBU, H-21HCWH and H-21HCWU
	8"X12"	PM	3.7Ω	158734-1 ②	8T-10S Mod. P8-X	5A1	③ Used in late production models H-21TOBH, H-21TOMH, and H-21TOWH
	5"	PM	3.7Ω	158733-1 ③			

COILS (RF-IF)

ITEM No.	USE	DC RES PRI.	DC RES SEC.	REPLACEMENT DATA CROSLEY Part No.	MEISSNER Part No.	MERIT Part No.	MILLER Part No.	NOTES
L1A	Ant. Coil	0ΩCT	0Ω	158021-2				Channel 2
B	Ant. Coil	0ΩCT	0Ω	158021-3				Channel 3
C	Ant. Coil	0ΩCT	0Ω	158021-4				Channel 4
D	Ant. Coil	0ΩCT	0Ω	158021-5				Channel 5
E	Ant. Coil	0ΩCT	0Ω	158021-6				Channel 6
F	Ant. Coil	0ΩCT	0Ω	158021-7				Channel 7
G	Ant. Coil	0ΩCT	0Ω	158021-8				Channel 8
H	Ant. Coil	0ΩCT	0Ω	158021-9				Channel 9
I	Ant. Coil	0ΩCT	0Ω	158021-10				Channel 10
J	Ant. Coil	0ΩCT	0Ω	158021-11				Channel 11
K	Ant. Coil	0ΩCT	0Ω	158021-12				Channel 12
L	Ant. Coil	0ΩCT	0Ω	158021-13				Channel 13
L2A	RF, Mixer grid, Osc. coils	0Ω		158022-3				Channel 2
B	RF, Mixer grid, Osc. coils	0Ω		158022-3				Channel 3
C	RF, Mixer grid, Osc. coils	0Ω		158022-4				Channel 4
D	RF, Mixer grid, Osc. coils	0Ω		158022-5				Channel 5
E	RF, Mixer grid, Osc. coils	0Ω		158022-6				Channel 6
F	RF, Mixer grid, Osc. coils	0Ω		158022-7				Channel 7
G	RF, Mixer grid, Osc. coils	0Ω		158022-8				Channel 8
H	RF, Mixer grid, Osc. coils	0Ω		158022-9				Channel 9
I	RF, Mixer grid, Osc. coils	0Ω		158022-10				Channel 10
J	RF, Mixer grid, Osc. coils	0Ω		158022-11				Channel 11
K	RF, Mixer grid, Osc. coils	0Ω		158022-12				Channel 12
L	RF, Mixer grid, Osc. coils	0Ω		158022-13				Channel 13
L3	Fil. Choke	0Ω		156906-51				
L4	RF Choke	0Ω		156906-52				
L5	Conv. Plate	.9Ω		158106-12				
L6	1st Video IF	.3Ω		157787-1	17-1003	TV-102	6188	
L7	2nd Video IF	.3Ω	.3Ω	157789-1	17-1062	TV-116	6350	
L8	Fil. Choke	0Ω		156356-1	19-3005	TV-129	6175	. 576 Microhenries
L9	3rd Video IF	.3Ω	.4Ω	157936-1			6353	Included 2L 9MC trap
L10	4th Video IF	.3Ω	.3Ω	157844-1			6351	
L11	Series Peaking Coil	3.1Ω		154376-1			6634	15.5 Microhenries
L12	1st Sound IF	2.7Ω	.9Ω	157941-1				
L13	Shunt Peaking Coil	18Ω		157833-1▲	19-3060■		6650■	710 Microhenries, Wound on 4.7KΩ resistor
L14	Series Peaking Coil	10Ω		158007-1†	19-3280▲	TV-135▲	6154▲	220 Microhenries, Wound on 27KΩ resistor
L15	2nd Sound IF	1.8Ω	3.3Ω	157856-1				
L16	Quadrature Coil	5.5Ω		157842-1	20-1005	TV-121	1470	
L17	Horiz. Osc.	123Ω*		157791-1	20-1402+	TV-163+	6183+	Waveform winding = 37Ω

* Tapped at 52Ω
■ Parallel with 4.7KΩ resistor in chassis 431; parallel with 6.8KΩ resistor in chassis 431-2.
▲ Parallel with 27KΩ resistor in chassis 431; parallel with 33KΩ resistor in chassis 431-2.
+ Reverse coil mounting in can.
▪ L13 wound on 6.8KΩ resistor in chassis 431-2 (part no. 158823-1).
† L14 wound on 33KΩ resistor in chassis 431-2 (part no. 158830-1).

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D.C. RESISTANCE	RATINGS INDUCTANCE 10 CURRENT 200 ᵐA	REPLACEMENT DATA CROSLEY Part No.	Stancor Part No.	Merit Part No.	Triad Part No.	Halldorson Part No.	Thordarson Part No.
L18	180ADC	55Ω	1. 1HY	B-155539-2-1	C-3336 ①	C-2996 ①	C-31X ①	C5037 ①	26C44 ①

① Drill one new mounting hole.

SELENIUM RECTIFIER

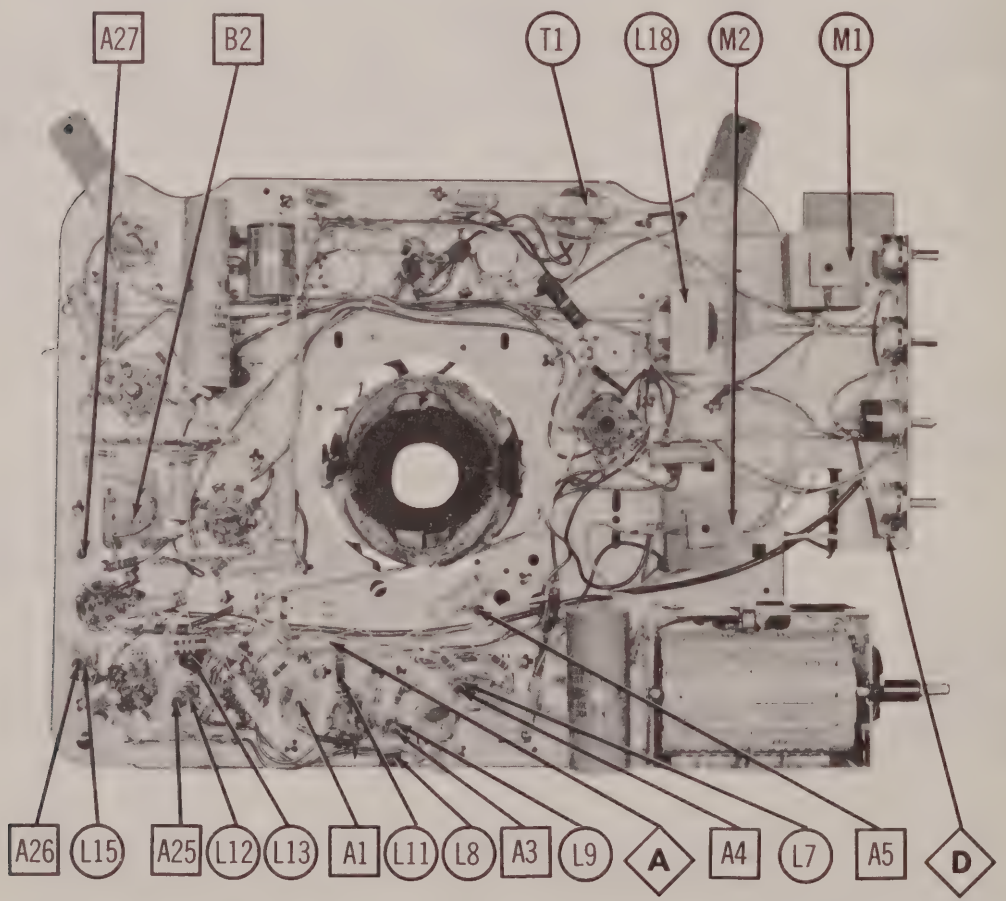
ITEM No.	RATING CURRENT	REPLACEMENT DATA CROSLEY Part No.	FEDERAL Part No.	INTERNATIONAL Part No.	MALLORY Part No.	SARKES TARZIAN Part No.	SELETRON Part No.	NOTES
M1	.180ADC	C-155575-2-1	1236A	RS300	6S300	300	6Q4	
M2	.180ADC	C-155575-2-1	1236A	RS300	6S300	300	6Q4	

CROSLEY MODELS G-21TOBH, TOBU, TOMH, TOMU, TOWH, H-21COBH, COBU, COMH, COMU, COSH, COWH, COWU, HCBH, HCBU, HCWH, HCWU, TOBH, TOMH, TOWH (Ch. 431, 431-2)

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	CROSLEY PART No.	NOTES
M3	Tuner	158116	UHF - Used in UHF Models
M4	Tuner	157282	VHF (VHF & VHF-UHF Models)
M5	Switch	*157867-1	VHF-UHF (*Alternate part #157750-4)
M6	Centering Device		Part of yoke cover
M7	Ion Trap	153109-2	
B3	Trimmer Cap.	157870-1	Horiz. Lock (10-160MMF)
	Cabinet Base	158250-1	All models except H-21TOBH, H-21TOMH, H-21TOWH
	Cabinet Base	158596-1	Models H-21TOBH, H-21TOMH, H-21TOWH
	Cabinet	158249-1	Less base - Model G-21TOMH
	Cabinet	158249-2	Less base - Model G-21TOBH
	Cabinet	158249-3	Less Base - Model G-21TOWH
	Cabinet	158601-1	Less base - Models H-21COMH, H-21COSH
	Cabinet	158601-2	Less base - Models H-21COBH, H-21COSBH
	Cabinet	158601-3	Less base - Model H-21COWH
	Cabinet	158613-1	Less base - Model H-21COMU
	Cabinet	158613-2	Less base - Model H-21COBU
	Cabinet	158613-8	Less base - Model H-21COWU
	Cabinet	158605-2	Less base - Model H-21HCBH
	Cabinet	158605-3	Less base - Model H-21HCWH
	Cabinet	158613-7	Less base - Model H-21HCBU
	Cabinet	158613-9	Less base - Model H-21HCWU
	Cabinet	158595-1	Less base - Model H-21TOMH
	Cabinet	158595-2	Less base - Model H-21TOBH
	Cabinet	158595-3	Less base - Model H-21TOWH
	Cabinet	158592-1	Less base - Model G-21TOMU
	Cabinet	158592-2	Less base - Model G-21TOBU
	Knob	157753-4	Channel Selector (VHF)
	Knob	157918-2	Channel Selector (UHF)
	Knob	157750-1	Control - 4 used - All models
	Knob	157754-1	Fine tuning (VHF)
	Knob	158359-1	Fine tuning (UHF)
	Safety Glass	155350-15	Models G-21TOBH, G-21TOMH, G-21TOWH, G-21TOMU, G-21TOBU
	Safety Glass	155350-18	Models H-21COMH, H-21COBH, H-21COWH, H-21COMU, H-21COBU, H-21COWU, H-21HCBH, H-21HCWH, H-21HCBU, H-21HCWU, H-21COSH, H-21COSBH, H-21TOMH, H-21TOBH, H-21TOWH
	Mask	158419-1	Models G-21TOBH, G-21TOMH, G-21TOWH, G-21TOMU, G-21TOBU
	Mask	158419-2	Models H-21COM H, H-21COBH, H-21COWH, H-21COMU, H-21COBU, H-21COWU, H-21HCBU, H-21HCBU, H-21HCWU, H-21COSH, H-21COSBH, H-21TOMH, H-21TOBH, H-21TOWH



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR & ALIGN. IDENTIFICATION

PROPERTY OF
L. F. CLARKSHIP
2924 WARE ST.
DENVER, COLORADO

TROUBLE SHOOTING AIDS (cont)

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V11, V12, V13 and V14. Check waveform W12.

If Satisfactory	If Unsatisfactory
Check T2, T4A, C69, C70, C68, R74 and other associated components.	Check L17, C65, C66, C67, C61, R63, R67, R70 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V12 and V13. Check M1 and M2. Check T2, T4A, R74, C67 and other associated components.

BLOOMING

Check by substitution V12 and V13. Check M1 and M2. Check R75, R74, R79, C1 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5 and V6. Check video IF components for failure or change of value.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

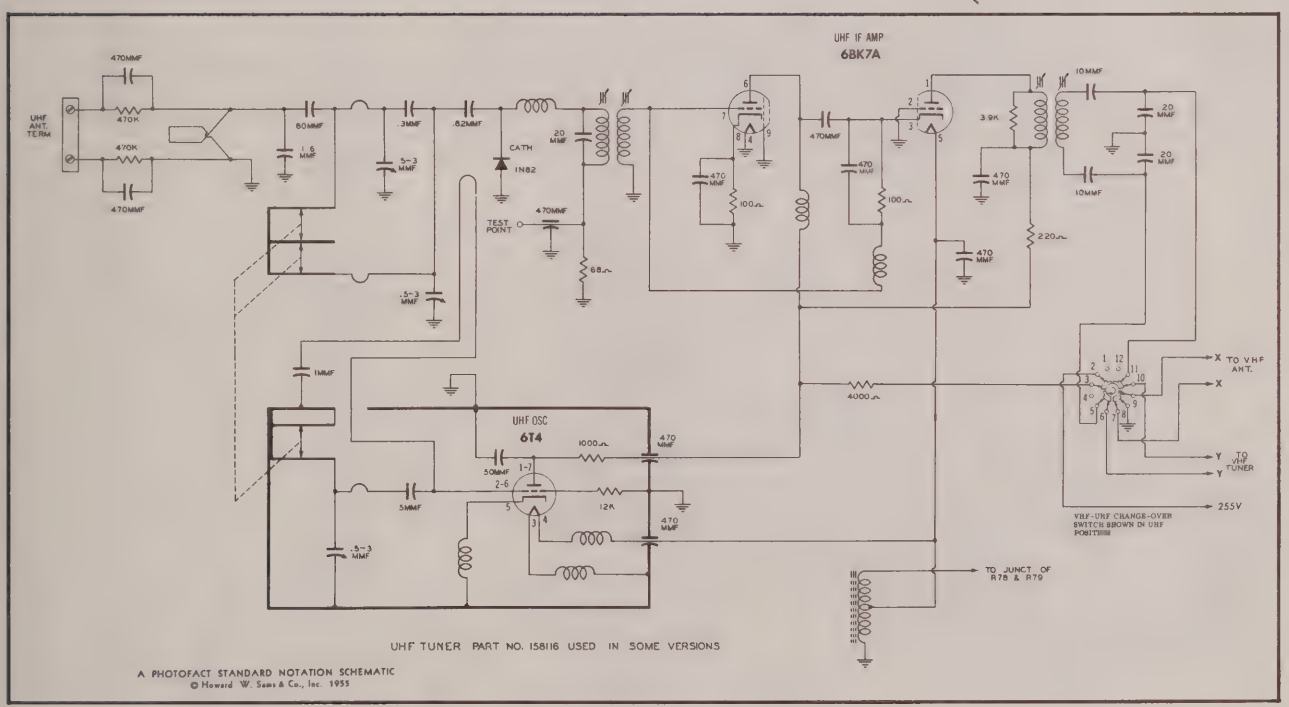
KEYSTONE EFFECT

Check T4 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



UHF TUNER SCHEMATIC

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, thru the small hole in the cabinet, below the channel selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass it is necessary to remove cabinet from chassis (See disassembly instructions).

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove cabinet from chassis (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION.

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator, it is necessary to remove the rear cover and supply power to set. Adjustment is located on top of chassis. Set the horizontal hold control at the center of its range and adjust the horizontal frequency slug (L17) until the picture synchronizes horizontally. (For location see tube placement chart).

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, it is necessary to remove the rear cover and supply power to set. Adjust the buzz control for maximum volume and minimum buzz. (See tube placement chart for location).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

CABINET REMOVAL

1. Remove 6 push-on type control knobs from side of cabinet.
2. Remove 5 wood screws. Remove rear cover.
3. Remove 1 metal screw from antenna bracket.
4. Remove 2 metal screws from interlock bracket.
5. Disconnect 2 speaker leads.
6. Remove 2 metal screws from top of chassis.
7. Remove 3 bolts from each side of the under side of the cabinet (6 bolts) and 1 wood screw from the front under side.
8. Remove 2 wood screws from the 2 cabinet braces located on the lower rear sides of the cabinet.
9. Slide cabinet forward and lift cabinet from mounting board.

SPEAKER REMOVAL

1. Remove 2 speaker nuts. Remove speaker.

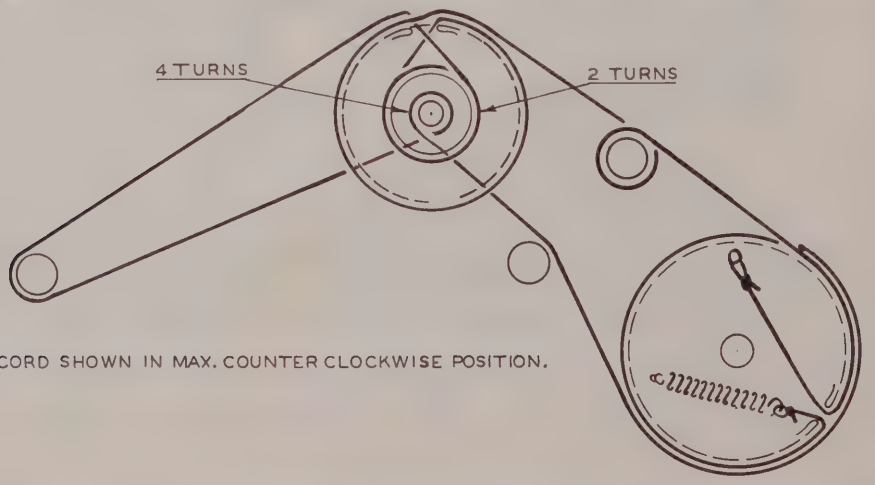
REMOVAL OF CHASSIS FROM MOUNTING BOARD

1. Remove ion trap and picture tube socket.
2. Disconnect HV lead.
3. Remove 2 nuts located on rear of chassis above neck of picture tube.
4. Remove 3 chassis bolts from under side of mounting board. Remove chassis.

PICTURE TUBE REMOVAL

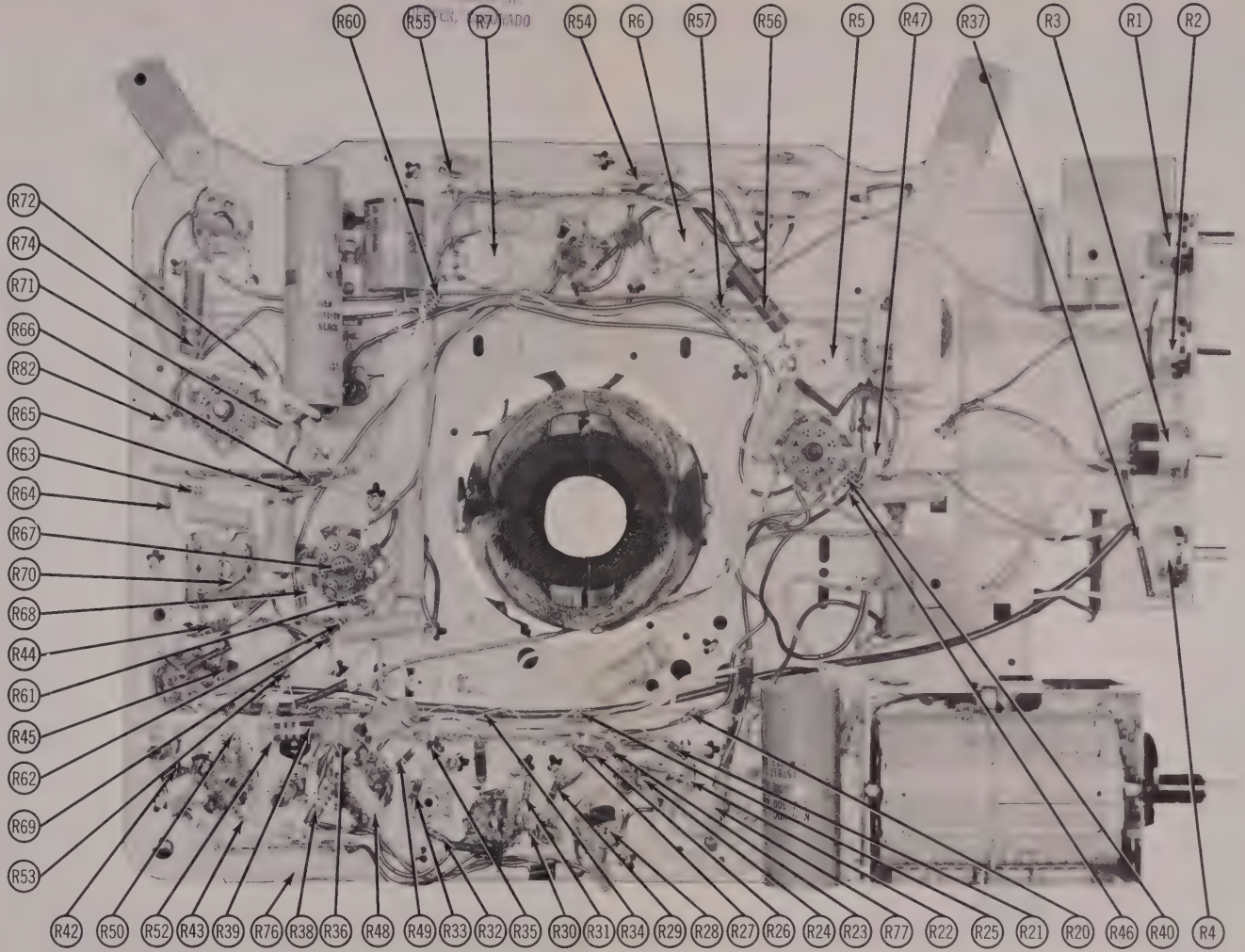
1. Remove cabinet, HV lead, picture tube socket and ion trap.
2. Remove bolt from front tube mounting band.
3. Remove picture tube.

NOTE: THIS CHASSIS SETS VERTICALLY AND CAN BE SERVICED WITHOUT REMOVAL FROM MOUNTING BOARD



DRIVE CORD SHOWN IN MAX. COUNTER CLOCKWISE POSITION.

DRIVE CORD STRINGING



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY OF
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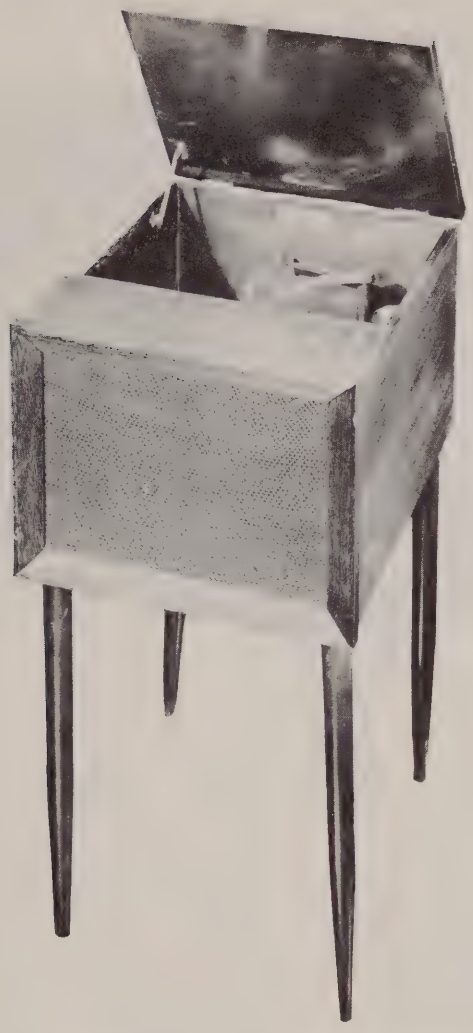
3924 MEADE ST.
DENVER, COLORADO

ARTHUR ANSLEY
MODEL HF7



ARTHUR ANSLEY
MODEL HF7

TRADE NAME	Arthur Ansley Model HF7
MANUFACTURER	Arthur Ansley Mfg. Co., Doylestown, Pa.
TYPE SET	AC Operated Phono Amplifier With 3 Speed Automatic Record Changer
TUBES (Three)	Types 6C4 AF Amp., 6V6GT Output, 6X4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .32 Amp. @ 117 Volts AC

RECORD CHANGER UNIT - WEBSTER-ELECTRIC MODEL 114

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

ARTHUR ANSLEY
MODEL HF7

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		ANSLEY PART No.	STANDARD REPLACEMENT		
V1	AF Amplifier	6C4	6C4	5BG	
V2	Output	6V6GT	6V6GT	7S	
V3	Rectifier	6X4	6X4	5BS	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	ANSLEY PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	■20	450		AFH2-51		B040		FP234	TVL-2755	
B	▲20	450								
C2	25	25		PRS25/25		BR252		TC26	TVA-1205	
C3	4	450		PRS450/4		BR445		TC70	TVA-1702	
C4	4	150		PRS150/4		BR415		TC40	TVA-1402	
C5	.01	400		P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C6	.02	400		P488-02	DF-203	CUB4S2		PT412	4TM-S2	
C7	.01	400		P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	Note 1
C8	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C9	.047	400		489ZX-047	DF-503	PJ4S47		PT4147	4TM-S47	
C10	.0068	400		P488-0068	D6-682	CUB6D68	GP2-333-682	PT6268	6TM-D68	Note 2

Note 1. Some versions use .047MFD in this application.
Note 2. Not used in all versions.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ANSLEY PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	2Meg	½	6163986	Q13-139	A47-2Meg-Z	AB-76	U-55	Volume
B	Shaft		Not Req.	Not Req.	RS-3	AK-9	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWE-12	KB-1	US-26	Attach to R1A
R2A	1Meg	½	CM11071	Q13-137	A47-1Meg-Z	AB-70	U-53	Tone
B	Shaft		Not Req.	Not Req.	RS-3	AK-9	Not Req.	Attach to R2A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ANSLEY PART No.	IRC PART No.	
R3	10Meg	½		BTS-10Meg	
R4	510KΩ	1		BTS-510K	
R5	270KΩ	1½		BTS-270K	

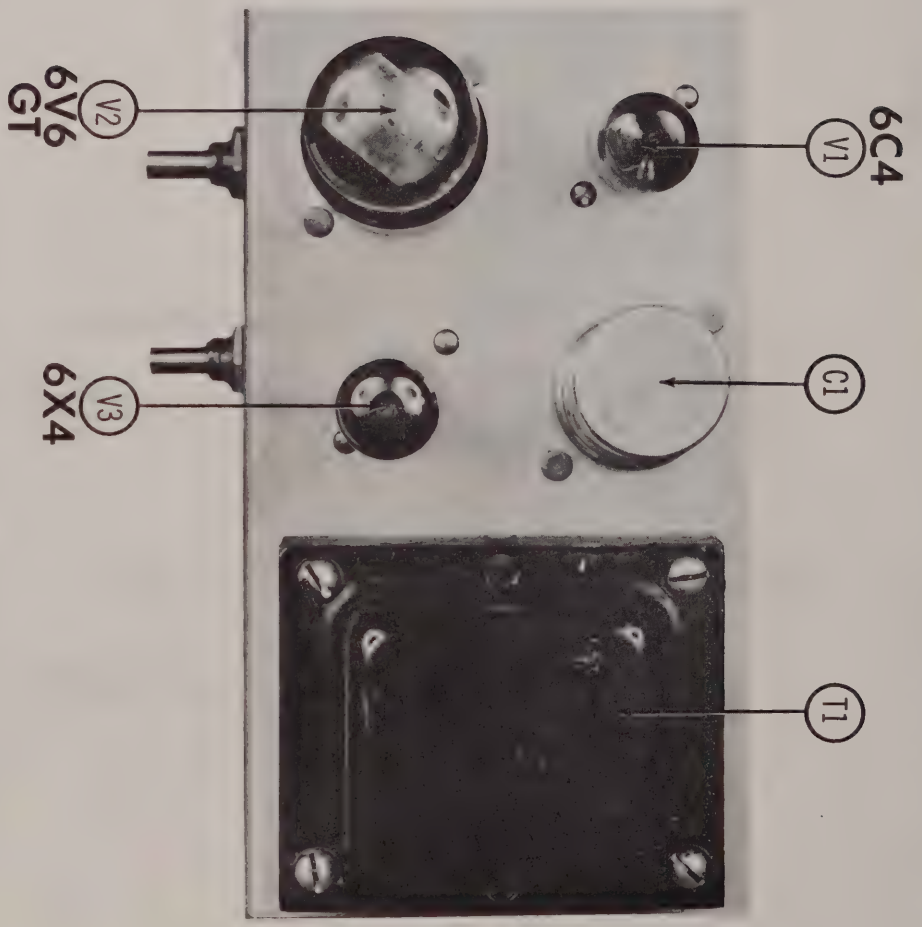
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ANSLEY PART No.	IRC PART No.	
R6	360Ω	4		BTA-4700	
R7	4700Ω	1			
R8	650Ω	7			

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA				
	PRI.	SEC. 1	SEC. 2	SEC. 3	ANSLEY PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.
T1	117VAC @.32A	616VCT @.05ADC	6.3VAC @1.16A			PM-8407 ①	P-2951 ①	R-7B ①	P9303 ①

① Tape 5V winding and 6.3V center tap.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ANSLEY PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T2	5.1KΩ	3.5Ω		A-3852	A-3019	S-5Z	Z1001	26S49	

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	ANSLEY PART No.	VIKING PART No.	QUAM PART No.	
SP1	10"	PM	3.3Ω		10J11	10A31	
SP2	3½"	PM	3.1Ω		35J4	3A07	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA							REMARKS
	ANSLEY PART No.	ASTATIC PART No.		SHURE PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1		ACD-J	A-1 A-3	W22A	A65MG A61A	96T	0-1 or S-1 & 0-3	

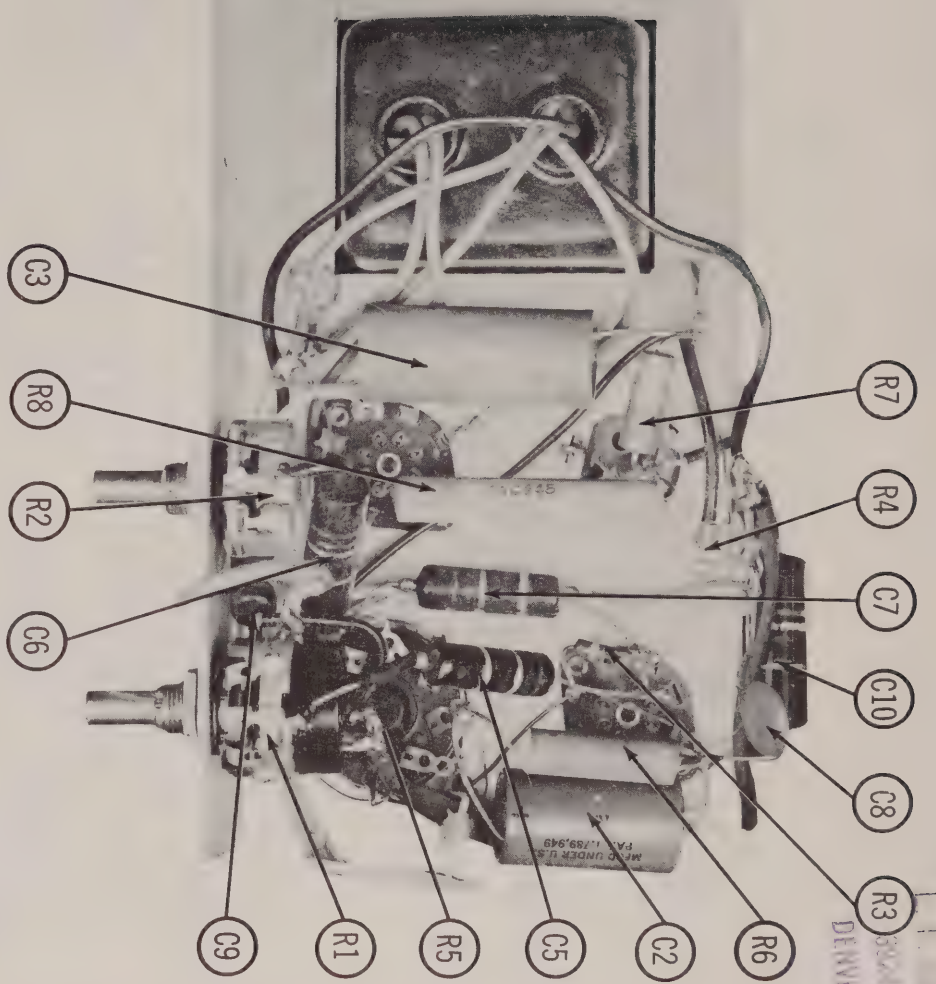
ASTATIC, SHURE AND ELECTRO-VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

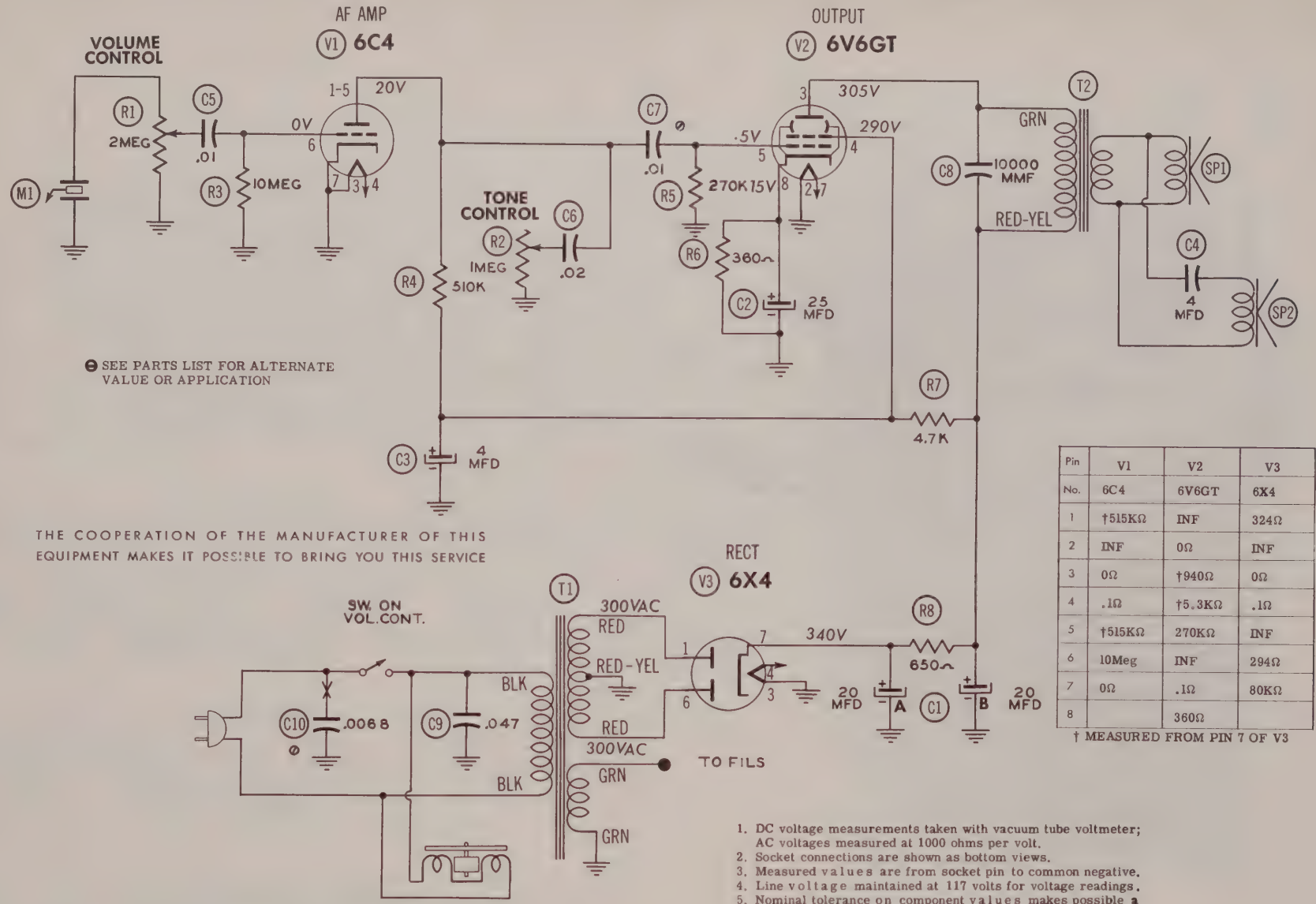
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA				REMARKS
	ANSLEY PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	
M2		†A-75LP or *A-85LP & †A-75 or *A-85	*A-319 or †A-347 or ♦A-347D & *C-309 or †C-348 or ♦C-348D	†W-5MGS or *W-5MGA & †W-5S or *W-5A	* Metal † Jewel ♦ Diamond

CHASSIS—BOTTOM VIEW



ARTHUR ANSLEY
MODEL HF7



Pin No.	V1 6C4	V2 6V6GT	V3 6X4
1	†515KΩ	INF	324Ω
2	INF	0Ω	INF
3	0Ω	†940Ω	0Ω
4	.1Ω	†5.3KΩ	.1Ω
5	†515KΩ	270KΩ	INF
6	10Meg	INF	294Ω
7	0Ω	.1Ω	80KΩ
8		360Ω	

† MEASURED FROM PIN 7 OF V3

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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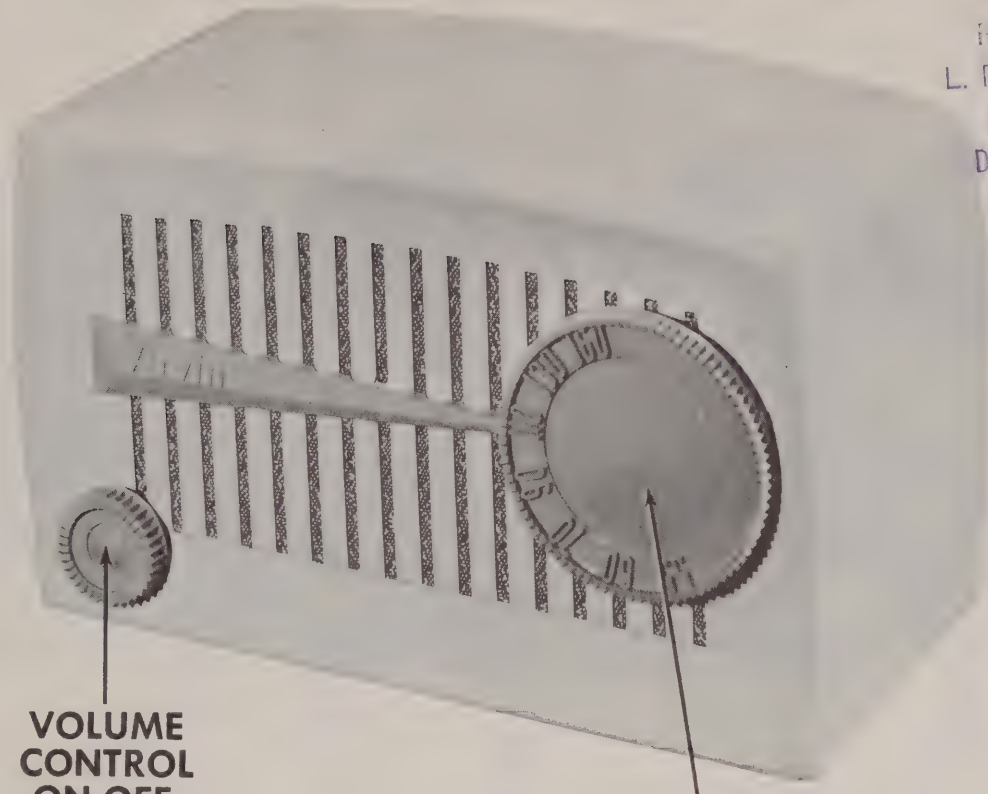
263-2

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST
DENVER, COLORADO

ARVIN
MODEL 840T (Ch. RE278-1)



ARVIN
MODEL 840T (Ch. RE278-1)

TRADE NAME	Arvin Model 840T (Ch. RE278-1)
MANUFACTURER	Arvin Industries, Columbus, Ind.
TYPE SET	AC-DC Operated AM Superheterodyne Receiver
TUBES (Four)	Types 12SA7 Conv., 12SQ7 Det-AVC-AF Amp., 50L6GT Output, 35Z5GT Rectifier
POWER SUPPLY	110-120 Volts AC-DC — RATING .25 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540 - 1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and chassis.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01MFD	High side to antenna stator lug on tuning gang. Low side to B-	455KC (400~ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2	Adjust for maximum output. If AC power is used without an isolation transformer, reduce dummy antenna to 200MMF to reduce hum modulation.
2	200MMF	Disconnect antenna from antenna coil lug and connect high side of generator to this lug. Low side to chassis.	1620KC	"	"	A3	Adjust for maximum output.
3	"	"	600KC	Tune to 600KC signal.	"		Bend slotted antenna rotor plates for maximum output. Repeat step 2. Reconnect antenna to antenna coil.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

ARVIN
MODEL 840T (Ch. RE278-1)

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		ARVIN PART No.	STANDARD REPLACEMENT		
V1	Converter	12SA7	12SA7	8R	
V2	Det-AVC-AF Amp.	12SQ7	12SQ7	8Q	
V3	Output	50L6GT	50L6GT	7S	
V4	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	ARVIN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	40	150		PRS150/40-40 -20		BBRT44215C		TN129	TVA-3436	Red
B	20	150								Blue
C	20	25								Green
C2	.05	200		P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C3	100	500		1468-0001		5W5T1				
C4	.01	400		P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	Note 1
C5A	5000									
B	250			*PA-112-2	*PC-71	*112TM2	*1406-02		*T-4	
C										
C6	.002	600		P688-002	D6-202	CUB6D2	GP2L-202	PT622	6TM-D2	
C7	.05	400		P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C8	.05	400		P488-05	DF-503	CUB4S5		PT415	4TM-S5	

Note 1: Some models may use a .002 MFD in this application.
* Items C5A, C5B, C5C, R6A and R6B are combined in one unit.
When replacing items individually items C5B and C5C total 250MMF.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ARVIN PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	2Meg	½	C23068	Q11-139	A47-2Meg-S	AB-75	U-56	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWE-12	KB-1	US-26	Attach to R1A

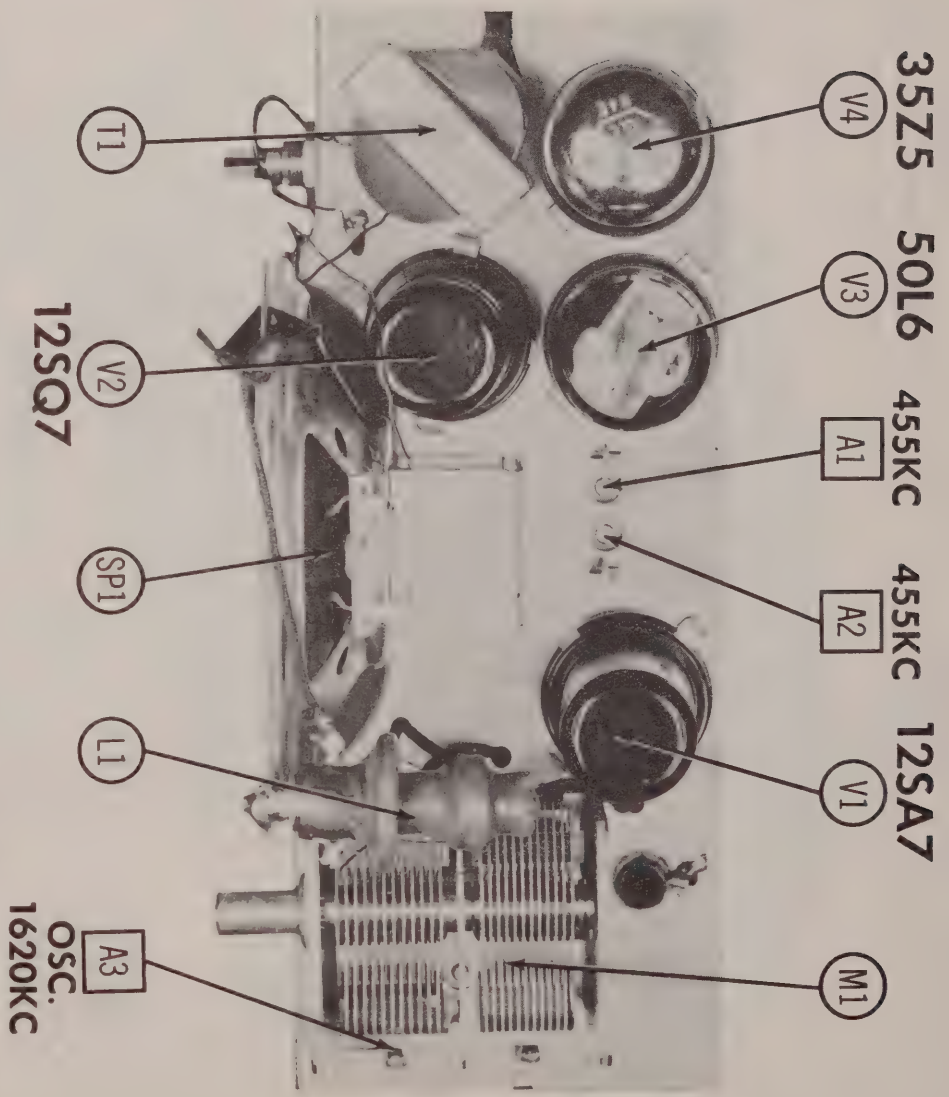
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ARVIN PART No.	IRC PART No.	
R2	330KΩ	½		BTS-330K	
R3	22KΩ	½		BTS-22K	
R4	4.7Meg	½		BTS-4.7Meg	
R5	15Meg	½		BTS-15Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ARVIN PART No.	IRC PART No.	
R6A	500KΩ	½	*		
B	500KΩ	½			
R7	120Ω	½		BTS-120	
R8	2200Ω	1		BTA-2200	
R9	47Ω	2			

* Items R6A, R6B, C5A, C5B, C5C are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ARVIN PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T1	2.1KΩ	3.1Ω		A-3332 ①	A-3025 ①	S-12X ①	Z1101 ①		① Bend mounting tabs down. File out slots, mount on original mounting bracket.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	ARVIN PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.1Ω	22875	ST-113 Mod. P4-X	4A07	

COILS (RF-IF)

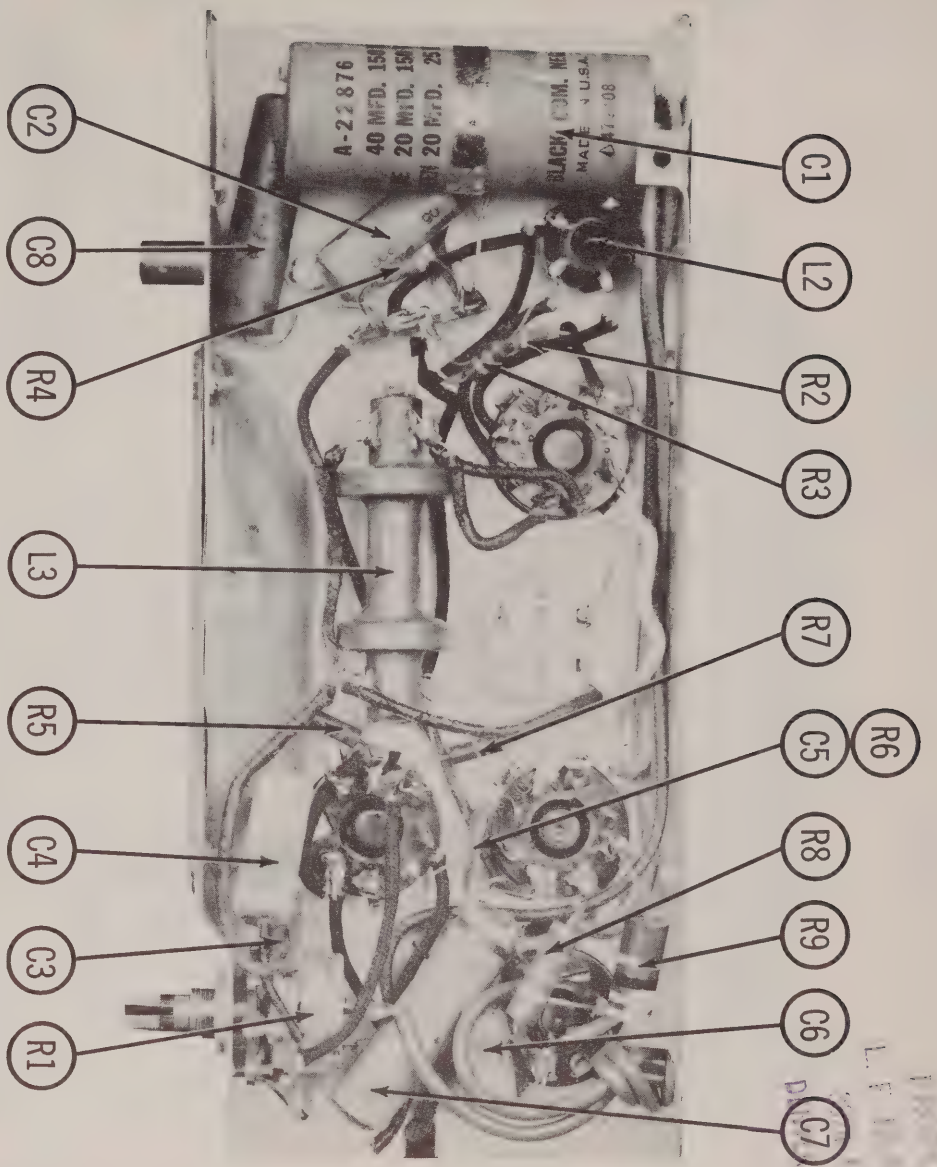
ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	ARVIN PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	32Ω	9Ω		14-1026*	BC-380*	72-A*	
L2	Osc. Coil	.5Ω	6.5Ω		14-1073■		69-Osc.*	
L3	IF Coil	15Ω	14Ω		16-6661▲	BC-375▲	1212-C▲	

* Drill mounting hole.
■ Leads sufficient mounting support.
▲ Drill tuning holes.

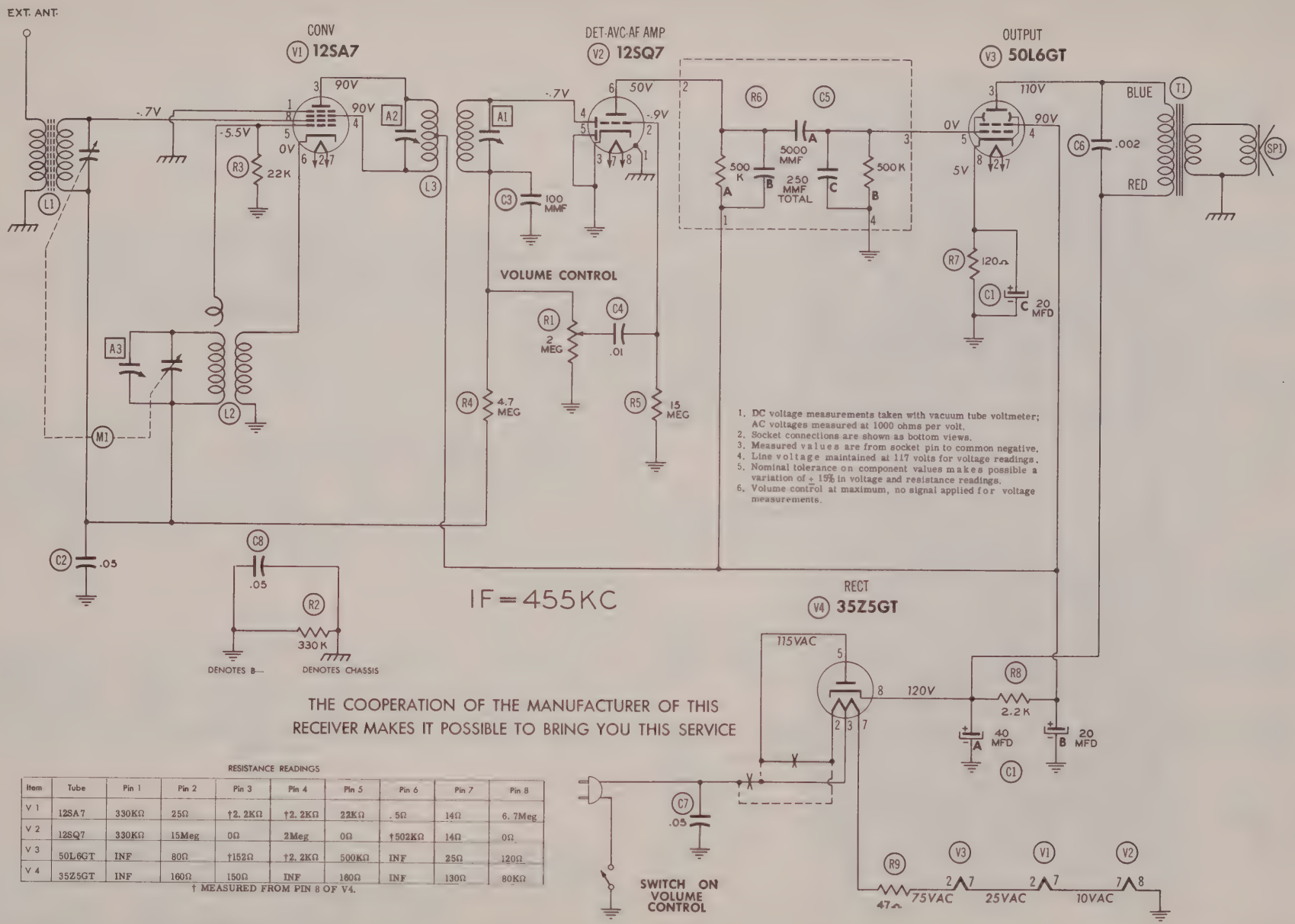
MISCELLANEOUS

ITEM No.	PART NAME	ARVIN PART No.	NOTES
M1	Tuning Cap.	C41835	10-375MMF; 28-263MMF.

CHASSIS—BOTTOM VIEW



ARVIN
MODEL 840T (Ch. RE278-1)



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12SA7	330KΩ	25Ω	†2. 2KΩ	†2. 2KΩ	22KΩ	. 5Ω	14Ω	6. 7Meg
V 2	12SQ7	330KΩ	15Meg	0Ω	2Meg	0Ω	†502KΩ	14Ω	0Ω
V 3	50L6GT	INF	80Ω	†152Ω	†2. 2KΩ	500KΩ	INF	25Ω	120Ω
V 4	35Z5GT	INF	160Ω	150Ω	INF	160Ω	INF	130Ω	80KΩ

† MEASURED FROM PIN 8 OF V4.

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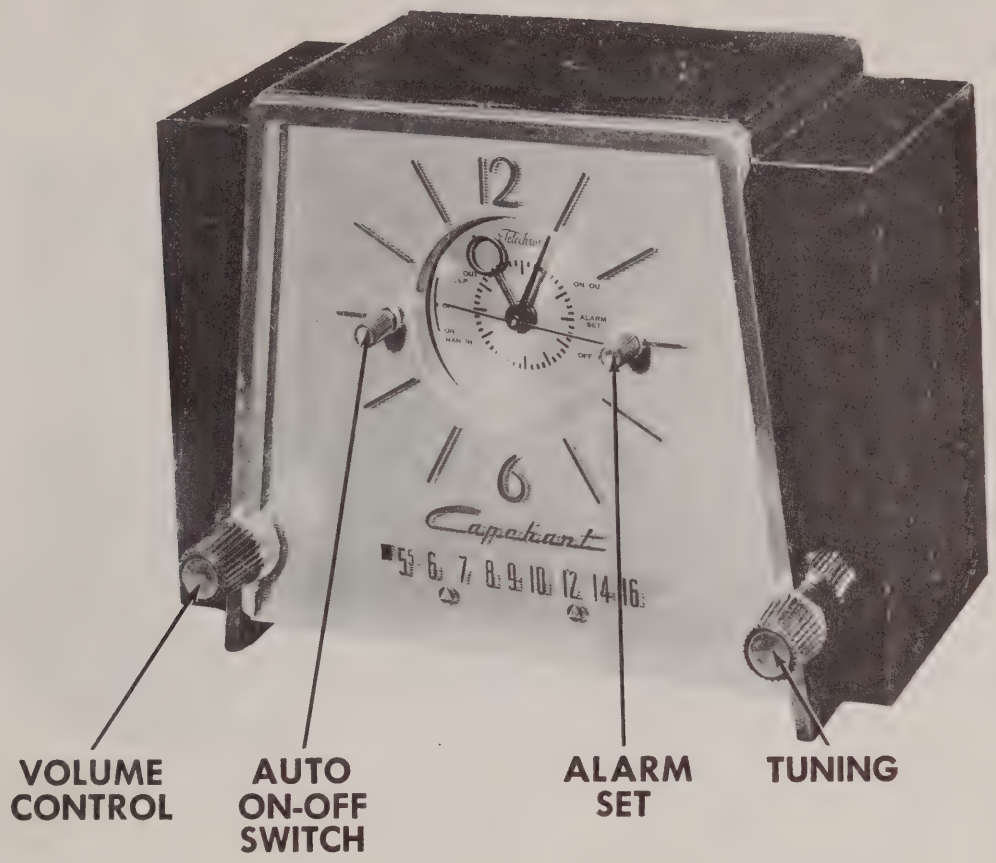
CAPEHART
MODEL C-14 (Ch. CR-93)

PROPERTY OF
L. F. [illegible]
3864 MEADE ST
DENVER, COLORADO

CAPEHART
MODEL C-14 (Ch. CR-93)



CAPEHART
MODEL C-14 (Ch. CR-93)

TRADE NAME	Capehart Model C-14 (Ch. CR-93)
MANUFACTURER	Capehart-Farnsworth Corp., Fort Wayne, Ind.
TYPE SET	AC Operated AM Superheterodyne Receiver With Electric Clock
TUBES (Four)	Types 12BE6 Conv., 12BA6 IF Amp., 12AV6 Det.-AVC-AF Amp., 6AK6 Output
POWER SUPPLY	105-120 Volts AC-60 Cycles
RATING	.15 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial. Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to antenna stator lug on tuning gang. Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If AC power is used without an isolation transformer, reduce dummy antenna to reduce hum modulation.
2.	"	"	1620KC	"	"	A5	"
3.	"	"	537KC	Tuning gang fully closed	"	A6	"
4.		Loop	1500KC	Tune to 1500KC signal	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

CAPEHART
MODEL C-14 (Ch. CR-93)

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		CAPEHART PART No.	STANDARD REPLACEMENT		
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amplifier	12BA6	12BA6	7BK	
V3	Det.-AVC-AF Amp.	12AV6	12AV6	7BT	
V4	Output	6AK6	6AK6	7BK	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	CAPEHART PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	50	150	750381A-5	PRS150/50-30-20		BBRT5515C		3N532	TVA-3436	
B	50	150								
C	20	25								
C2	20000		450469A-10	BPD-02	DD-203					
C3	470		2239-013	SI470	D6-471		GP1K-471	UC-5347	5GA-T47	
C4	56		2241-554							
C5A	220									
B	2000									
C	5000		*452244A-1	*PA-113-1	*PC-150	*116TM1	*1408-01		*DT-1	
D	250									
E										
C6	.0068	600	2248-6820	P688-0068	D6-682	CUB6D68	GP2-333-682	PT6268	6TM-D68	
C7	.047	600	2248-4750	P688-047	DF-503	CUB6S47		PT6147	6TM-S47	
C8	.047	600	2248-4750	P688-047	DF-503	CUB6S47		PT6147	6TM-S47	
C9	.1	400	2247-1040	P488-1	DF-104	CUB4P1		PT401	4TM-P1	

* Items C5A, C5B, C5C, C5D, C5E, R8A, R8B and R8C are combined in one unit.
When replacing items separately, C5D and C5E should total 250MMF.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	CAPEHART PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	750266A-8	Q13-133	A47-500K-Z	AB-58	U-48	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R1A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CAPEHART PART No.	IRC PART No.	
R2	47Ω	½	3229-470	BTS-47	
R3	1Meg	½	3230-105	BTS-1Meg	
R4	22KΩ	½	3230-223	BTS-22K	
R5	47Ω	½	3229-470	BTS-47	
R6	220KΩ	½	3230-224	BTS-220K	
R7	3.3Meg	½	3230-335	BTS-3.3Meg	

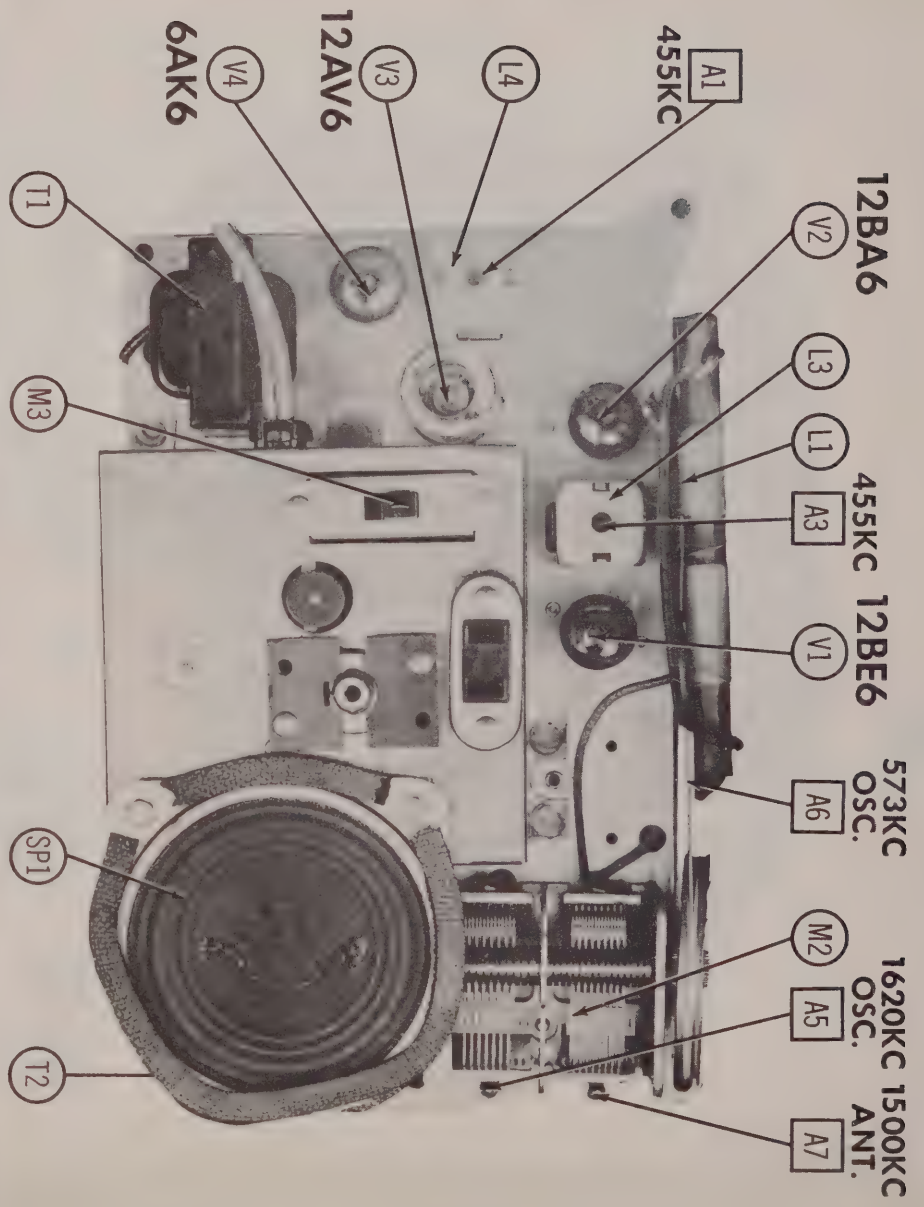
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CAPEHART PART No.	IRC PART No.	
R8A	6.8Meg	½	*452244A-1	BTS-6.8Meg	
B	470KΩ	½		BTS-470K	
C	470KΩ	½		BTS-470K	
R9	390Ω	½	3229-391	BTS-390	
R10	1500Ω	1	3232-152	BTA-1500	
R11	33Ω	1	650101-19		

* Items R8A, R8B, R8C, C5A, C5B, C5C, C5D, C5E are combined in one unit.

TRANSFORMER (FILAMENT)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	CAPEHART PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @ .1A tap @ 44VAC @ .15A				650726A-1					

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA: CAPEHART PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T2	8.7KΩ	3.3Ω	453489B-2	A-3329	A-2927 ①	S-8X	Z1110		① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: CAPEHART PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	3"	PM	3.3Ω	650275A-1			

COILS (RF-IF)

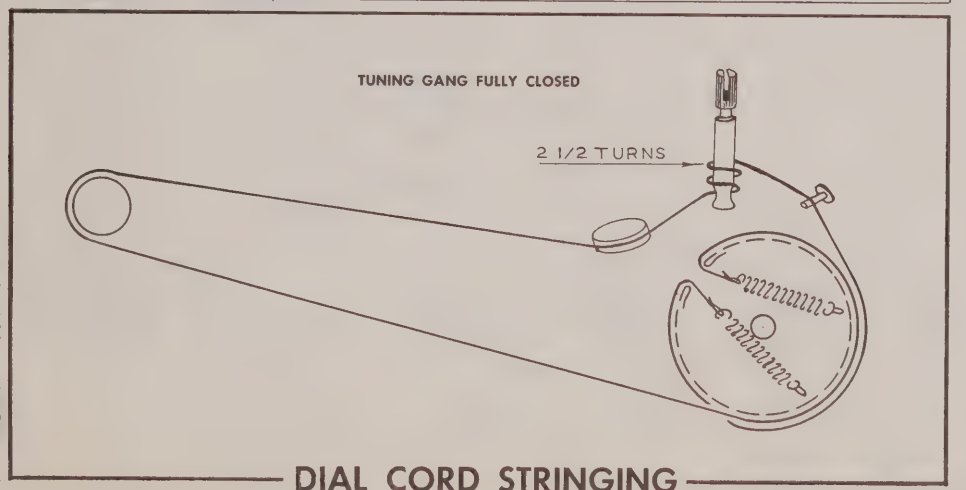
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: CAPEHART PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Coil	.5Ω		650731B-1				
L2	Osc. Coil	.7Ω	5.5Ω	650736C-1	14-1073		71-Osc.	
L3	Input IF	14Ω	14Ω	452243A-1	16-6758	BC-352	12-C1	
L4	Output IF	14Ω	14Ω	650741A-1	16-6770			

SELENIUM RECTIFIER

ITEM No.	RATING: CURRENT	REPLACEMENT DATA: CAPEHART PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	SELETRON PART No.	NOTES
M1	.030ADC	650150D-8	1002A	RS050	6S65	65	8J1	

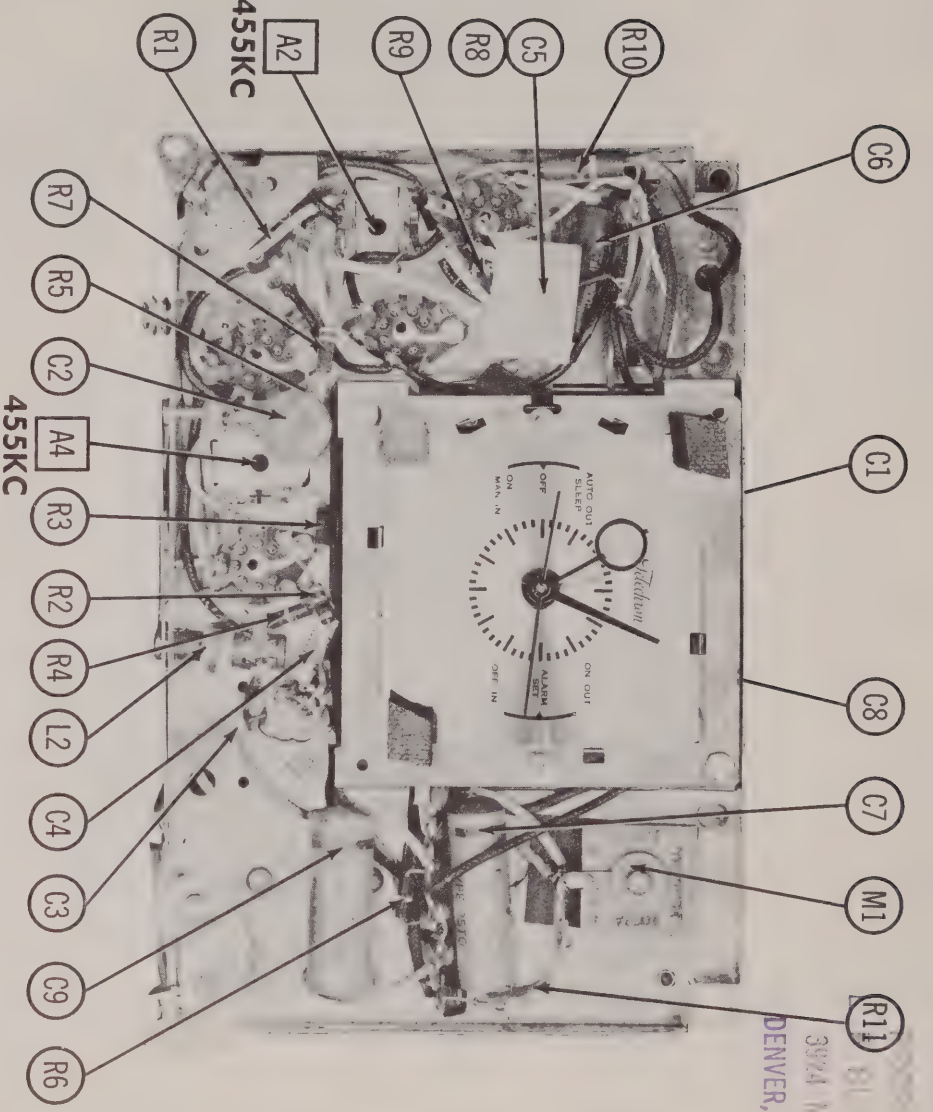
MISCELLANEOUS

ITEM No.	PART NAME	CAPEHART PART No.	NOTES
M2	Tuning Cap.	650724A-1	20-278MMF, 13-106MMF
M3	Switch	453564A-1	Radio - Phono
	Cabinet	850268C-1	Ebony
	Cabinet	850268C-2	Dresden White
	Cabinet Back	750441B-1	Ebony
	Cabinet Back	750441B-2	Dresden White
	Knobs	451449A-1	Ebony - Radio & Clock (2 for Radio & 2 for Clock)
	Knobs	451450A-1	Dresden White - Radio & Clock (2 for Radio & for Clock)
	Clock	750437B-1	
	Pointer	453558B-1	



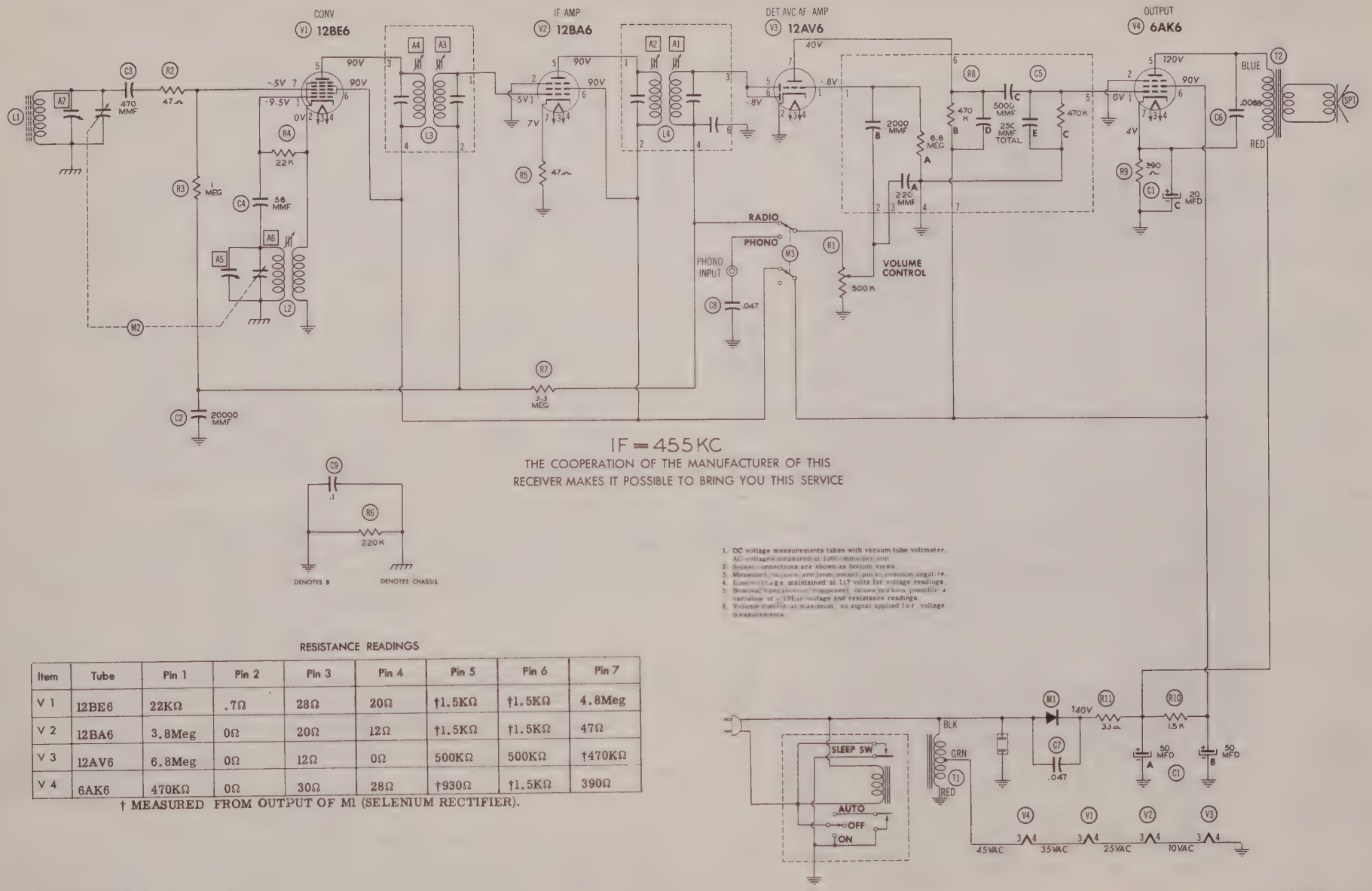
DIAL CORD STRINGING

CHASSIS—BOTTOM VIEW



CAPEHART MODEL C-14 (Ch. CR-93)

CAPEHART MODEL C-14 (Ch. CR-93)



IF = 455 KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured [illegible] are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Normal tolerance of component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.7Ω	28Ω	20Ω	†1.5KΩ	†1.5KΩ	4.8Meg
V 2	12BA6	3.8Meg	0Ω	20Ω	12Ω	†1.5KΩ	†1.5KΩ	47Ω
V 3	12AV6	6.8Meg	0Ω	12Ω	0Ω	500KΩ	500KΩ	†470KΩ
V 4	6AK6	470KΩ	0Ω	30Ω	28Ω	†930Ω	†1.5KΩ	390Ω

† MEASURED FROM OUTPUT OF M1 (SELENIUM RECTIFIER).

PHOTOFACT STANDARD NOTATION SCHEMATIC
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CARDWELL
MODEL ES-1 (UHF Conv.)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CARDWELL
MODEL ES-1 (UHF Conv.)

CHANNEL SELECTOR SWITCH ON-OFF SWITCH

TUNING

CARDWELL
MODEL ES-1 (UHF Conv.)

TRADE NAME	Cardwell Model ES-1
MANUFACTURER	Allen D. Cardwell Mfg. Corp., 95 Whiting St., Plainville, Conn.
TYPE SET	AC Operated All Channel UHF Converter
TUBES (Two)	Types 6AF4 Oscillator, 6CB6 IF Amp.
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .07 Amp. @ 117 Volts AC

THIS UNIT HAS BEEN PROPERLY ALIGNED AT THE FACTORY AND IS VERY STABLE. ALIGNMENT SHOULD NOT BE REQUIRED IN THE FIELD.

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PARTS LIST AND DESCRIPTIONS

CARDWELL MODEL ES-1

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		CARDWELL PART No.	STANDARD REPLACEMENT		
V1	Oscillator	6AF4	6AF4	7DK	
V2	IF Amplifier	6CB6	6CB6	7CM	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	CARDWELL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	50	150		PRS150/50-50		BBRD5515		TCD49	TVA-2453	Red
B	50	150								Blue
C2	10									
C3	.7-1.2									
C4	10									
C5	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C6	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C7	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C8	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C9	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C10	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C11	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CARDWELL PART No.	IRC PART No.	
R1	10KΩ	½		BTS-10K	
R2	180Ω	½		BTS-180	
R3	100Ω	½		BTS-100	

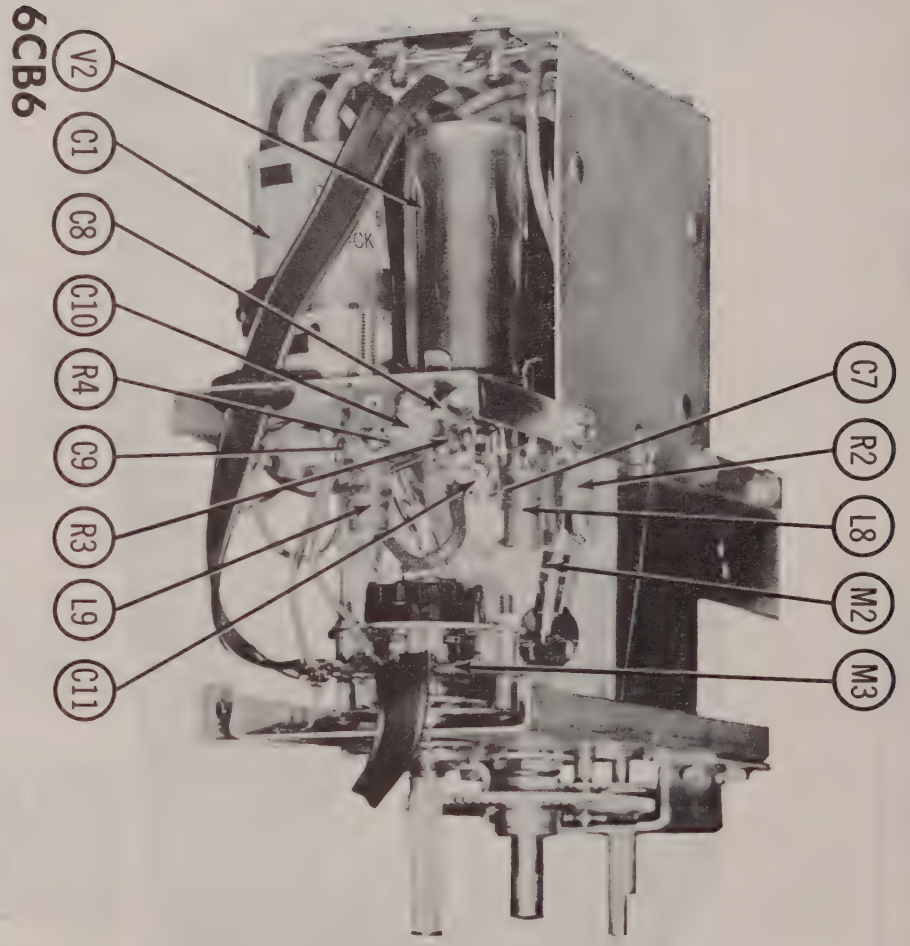
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CARDWELL PART No.	IRC PART No.	
R4	330Ω	½		BTS-330	
R5	470Ω	1		BTA-470	
R6	47Ω	½		BTS-47	

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	CARDWELL PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @ .07A	125VAC .025ADC	6.3VAC @ .53A		Z-0099A		P-3046 ① ②			26R32

① Drill new mounting holes.
② Tape 6.3VCT

CHASSIS—SIDE VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	CARDWELL PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	UHF Input Coil	0Ω						
L2	UHF Fil. Choke	0Ω						
L3	UHF Fil. Choke	0Ω						
L4	UHF Cathode Choke	0Ω						
L5	UHF Osc. Coil	0Ω						
L6	UHF RF Choke	0Ω						
L7	UHF Osc. Coupling	0Ω						
L8	UHF Input IF	0Ω	0Ω					
L9	UHF Output IF	0Ω	0Ω					

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	CARDWELL PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	SELETRON PART No.	
M1	.025		1263A			50	8J1	

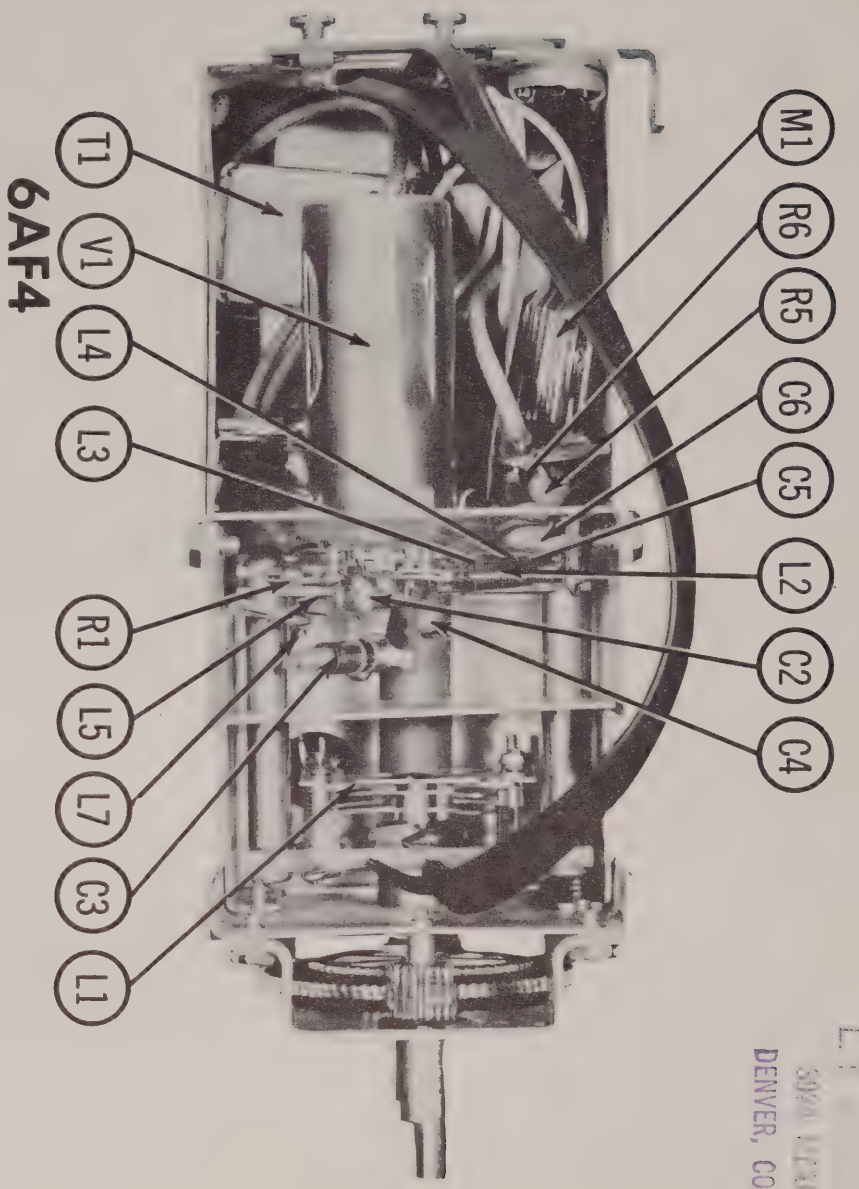
CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		CARDWELL PART No.	SYLVANIA PART No.	FEDERAL PART No.	
M2	67A		1N82 or 1N82A	1N72A	UHF Mixer

MISCELLANEOUS

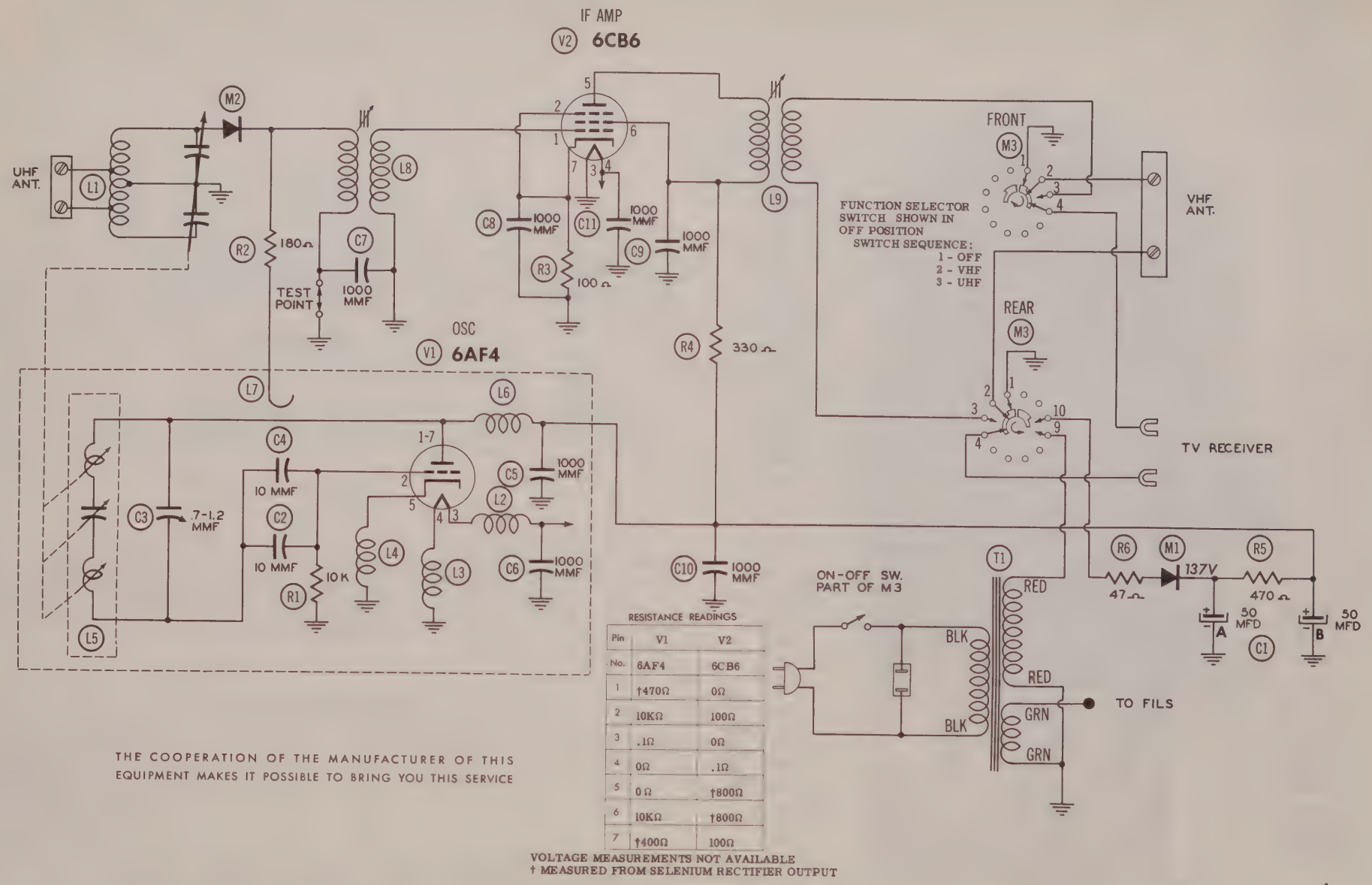
ITEM No.	PART NAME	CARDWELL PART No.	NOTES
M3	Switch		UHF-VHF Switch

CHASSIS—SIDE VIEW



DENVER, COLORADO

CARDWELL MODEL ES-1



RESISTANCE READINGS

Pin No.	V1 6AF4	V2 6CB6
1	†470Ω	0Ω
2	10KΩ	100Ω
3	.1Ω	0Ω
4	0Ω	.1Ω
5	0Ω	†800Ω
6	10KΩ	†800Ω
7	†400Ω	100Ω

VOLTAGE MEASUREMENTS NOT AVAILABLE
† MEASURED FROM SELENIUM RECTIFIER OUTPUT

THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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PHOTOFACT* Folder

RETMA MEMBER

EMERSON MODELS
748B, C, 777B, 787A, B, 796C, 797B, C, 798B
(Ch. 120179B, 120203B, 120204B, 120205B)

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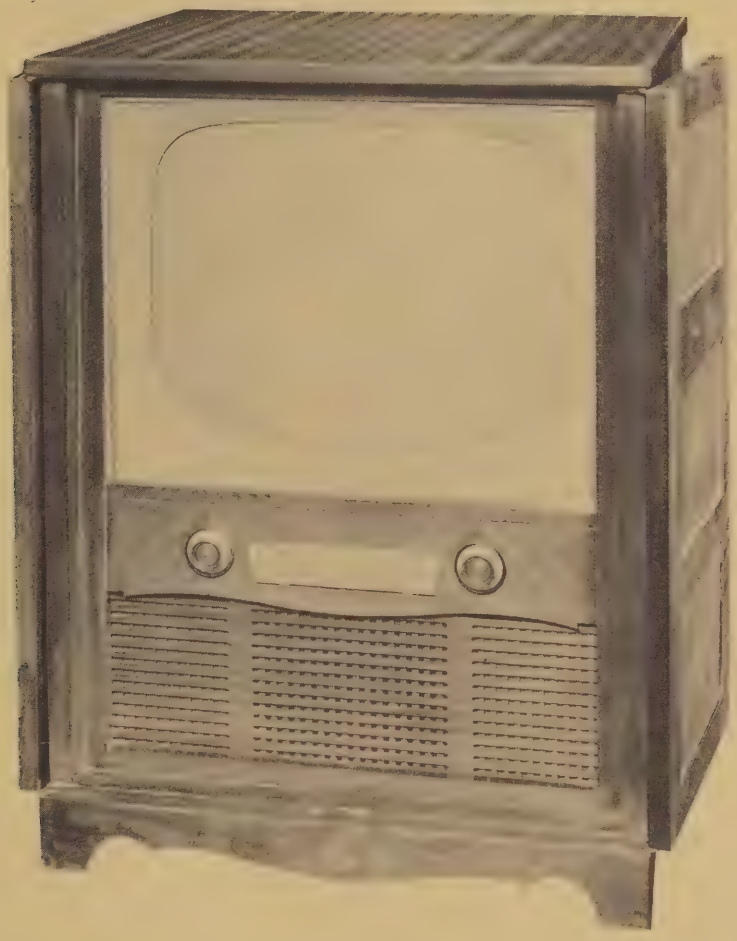

MODEL 798B

EMERSON MODELS
748B, C, 777B, 787A, B, 796C, 797B, C, 798B
(Ch. 120179B, 120203B, 120204B, 120205B)

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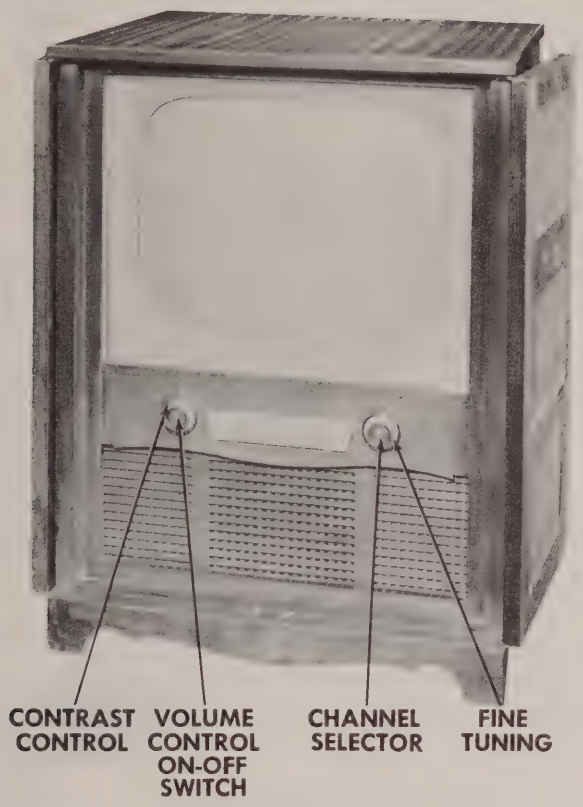

EMERSON MODEL 798B

TRADE NAME	Emerson	Models	Chassis
		748B, 787A	120179-B UHF-VHF
		748C, 787B, 796C	120203-B UHF-VHF
		777B, 797B	120204-B VHF only
		797C, 798B	120205-B VHF only
MANUFACTURER	Emerson Radio & Phono Corp., 111 Eighth Ave., New York, N. Y.		
TYPE SET	Television Receiver		
TUBES	Twenty-five		
POWER SUPPLY	110-120 Volts AC - 60 Cycles	RATING 2.37 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

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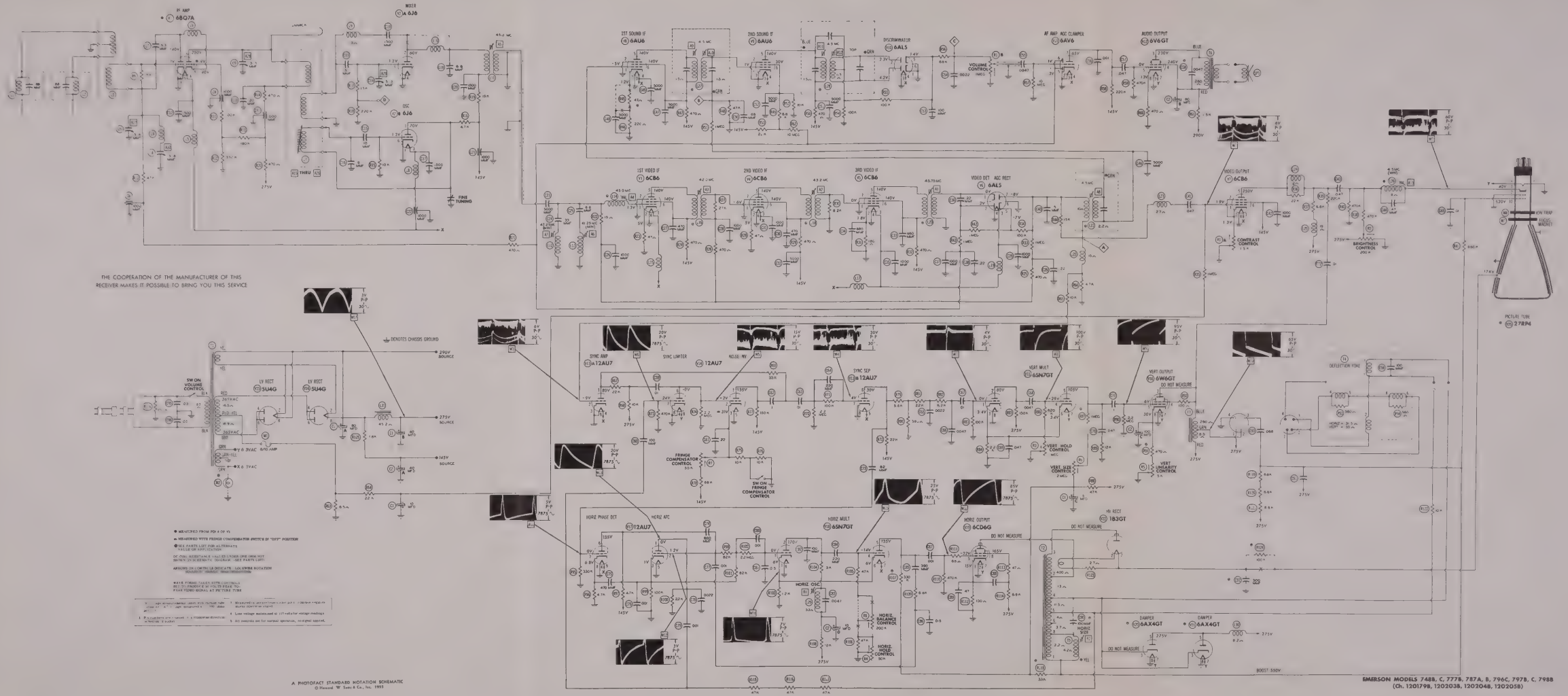

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(Ch. 120179B, 120203B, 120204B, 120205B)

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(Ch. 120179B, 120203B, 120204B, 120205B)

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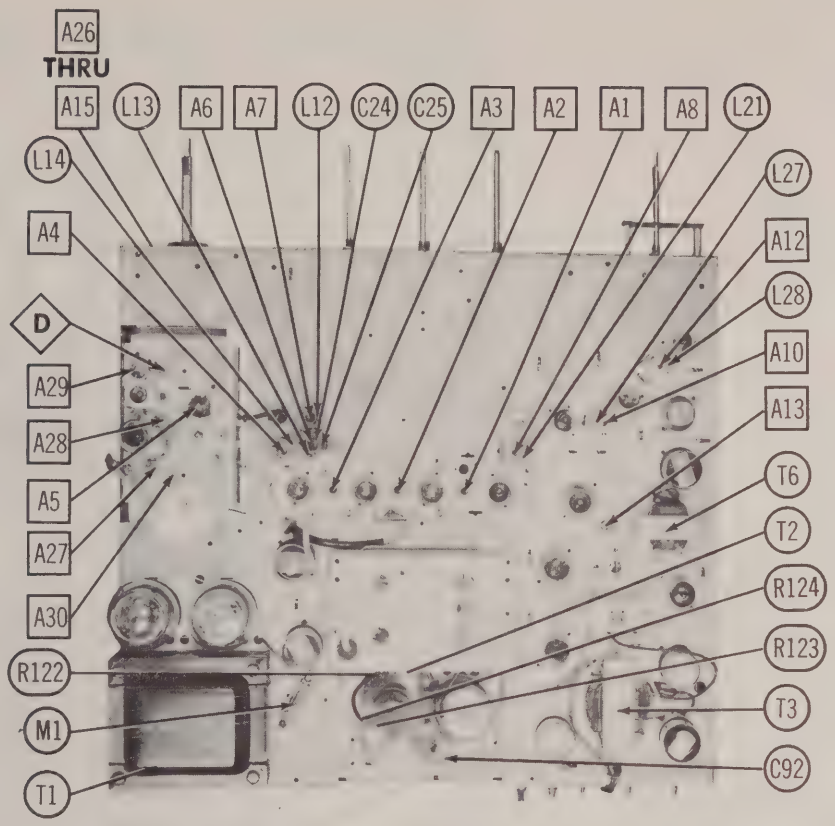
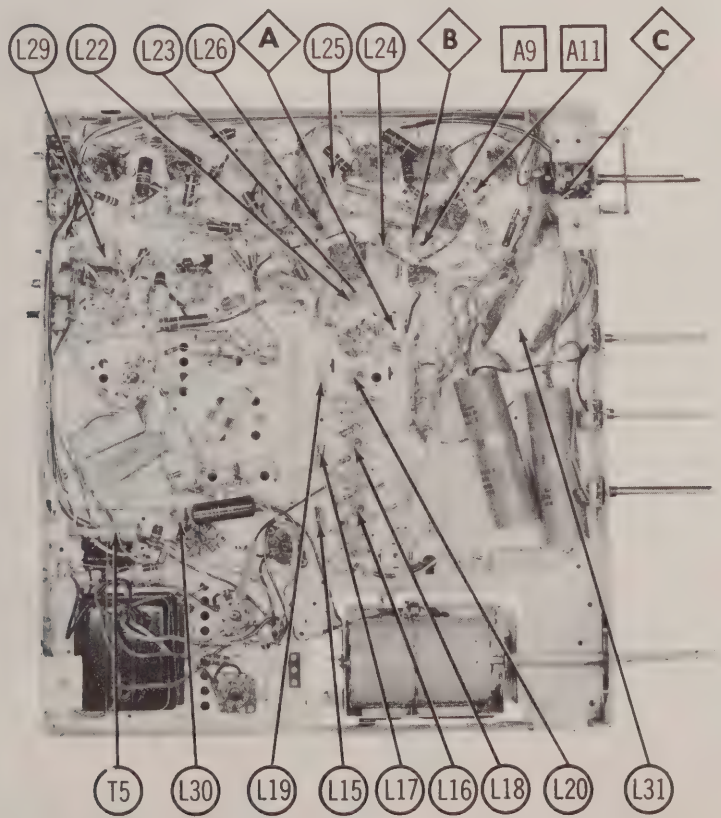


CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

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CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

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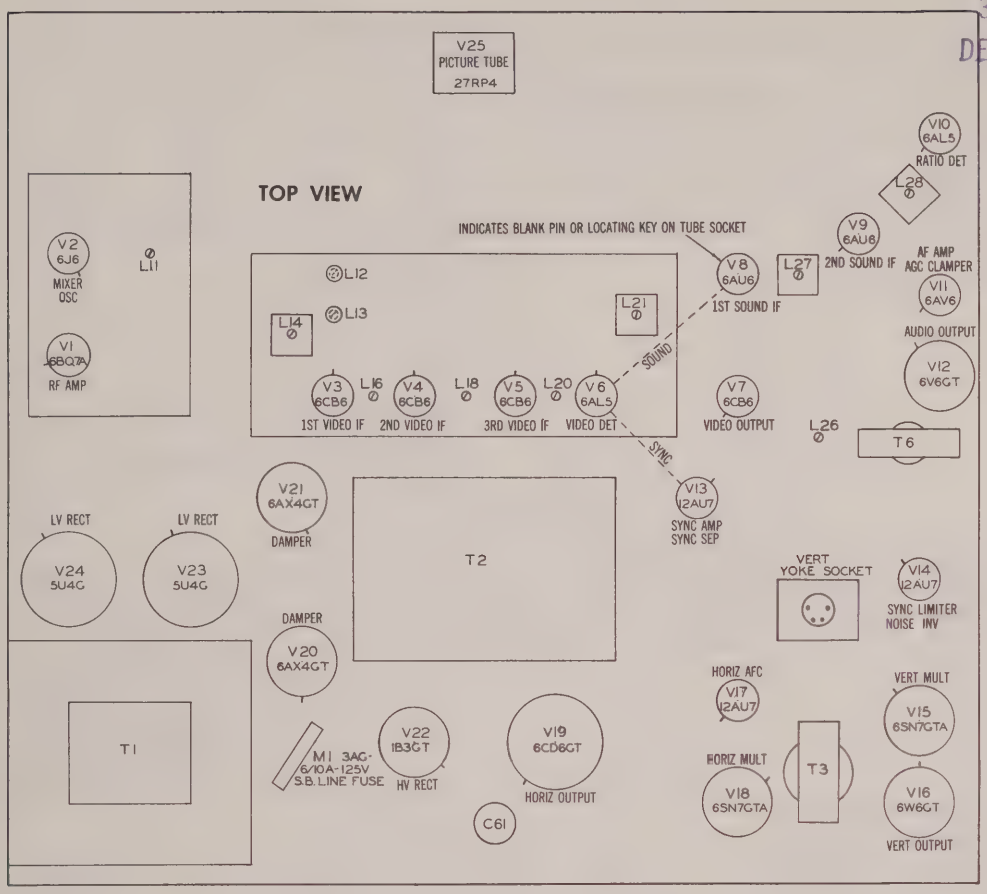
TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V23, V24, Fuse (M1)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V7, V25**
Has pic, no sound - **V8, V9, V10, V11, V12**
Overloaded picture - **V11**

SYNC FAILURE
No vert. sync - **V13, V15**
No horiz. sync - **V13, V17, V18**
No vert. or horiz. sync - **V13, V14**

SWEEP FAILURE
No raster, has sound - **V18, V19, V20, V21, V22, V25**
No vertical deflection - **V15, V16**
Poor vert. linearity or foldover - **V15, V16**
Poor horiz. linearity or foldover - **V18, V19, V20, V21**
Narrow picture - **V18, V19, V20, V21, V22, V23, V24**
Vert. off freq. - **V13, V15**
Horiz. off freq. - **V13, V17, V18**

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ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal multivibrator tube (V18) to disable the high voltage.

VIDEO IF ALIGNMENT

Remove the converter tube (V2) from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
Connect the negative lead of a 3 volt battery to the ungrounded side of C29. Connect the positive side to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	45.75MC (Unmod)	Any	DC probe to point (A) Common to chassis.	A1	Attenuate generator output to maintain not more than -2 volts at VTVM. Adjust for maximum deflection.
2.	"	"	43.2MC	"	"	A2	"
3.	"	"	42.0MC	"	"	A3	"
4.	"	"	45.0MC	"	"	A4, A5	"
5.	"	"	41.25MC	"	"	A6	Increase generator output and adjust A6 for MINIMUM deflection.
6.	"	"	47.25MC (400%Mod)	"	Use Scope. Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A7	Use maximum signal generator output and high scope gain. Adjust A7 for MINIMUM 400% response on scope.

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Use only enough sweep generator output to provide usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	44MC (10MC Swp)	41.25MC 45.75MC 47.25MC	Any	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.		Check for response curve similar to Fig. 1. If necessary, retouch A1 thru A5 to obtain desired response. Use high scope gain. Adjust sweep and marker generators for maximum output to view 41.25 and 47.25MC trap regions. It may be necessary to temporarily remove bias battery to view the 47.25MC trap. MINIMUM marker amplitude should occur when markers are centered in trap notches.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Short pin 1 (grid) of 6CB6 (V5) to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
8.	.01MFD	High side to pin 7 (plate) of 6AL5 (V6). Low side to chassis.	4.5MC (Unmod)	Any	DC probe thru 10KΩ to point (A). Common to chassis.	A8, A9, A10	Attenuate generator output to maintain approximately 1 volt above noise voltage. Adjust A8, A9 and A10 for maximum deflection.
9.	.01MFD	"	"	"	DC probe thru 10KΩ to point (A). Common to chassis.	A11, A12	Detune A13 for maximum negative deflection. Adjust A11 for maximum deflection. Readjust A13 for zero reading on VTVM. Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Remove short from grid of V5 to chassis.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Short pin 1 (grid) of 6CB6 (V5) to chassis.
Use frequency modulated signal with 80% modulation and 450KC sweep. Use 130V sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	.01MFD	High side to pin 7 (plate) of 6AL5 (V6). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A8, A9, A10	Adjust for curve of maximum amplitude and symmetry similar to Fig. 2.
9.	"	"	"	"	"	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A11, A12	Adjust A12 so that 4.5MC occurs at center of crossover lines as in Fig. 3. Adjust A11 for maximum amplitude and straightness of crossover lines. Remove short from grid of V5 to chassis.

SOUND IF ALIGNMENT USING "ON THE AIR" SIGNAL AND VTVM

If a signal generator capable of producing a 4.5MC signal of crystal accuracy is not available, tune in any local TV station. Connect the VTVM and adjust A8 thru A12 as outlined in steps 7 and 8 of "Sound IF Alignment Using AM Signal Generator and VTVM".

4.5MC TRAP ALIGNMENT

Set contrast control fully clockwise.
Short pin 1 (grid) of 6CB6 (V5) to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
10.	.01MFD	High side to pin 1 (grid) of 6CB6 (V7). Low side to chassis.	4.5MC (Unmod)	Any	DC probe thru detector (Fig.4) to pin 11 (cathode) of picture tube.	A13	Adjust for MINIMUM deflection.

ALTERNATE 4.5MC TRAP ALIGNMENT

Tune in a TV station and adjust the fine tuning control to emphasize the 4.5MC beat interference in the picture. Adjust A13 to minimize the 4.5MC beat interference in the picture.

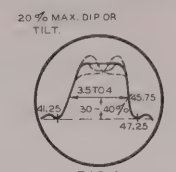


FIG. 1

FIG. 2

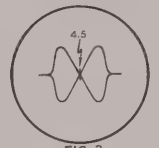


FIG. 3

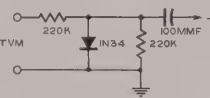


FIG. 4

FIG. 5

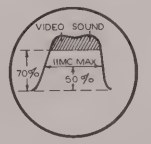


FIG. 6

OSCILLATOR ALIGNMENT (TUNER #470696 USED ON VHF CHASSIS 120304-B) AND 120306-B)

Remove the dummy converter tube and replace the original 6J6 in its socket.
Leave bias battery connected as under "Video IF Alignment" but connect a jumper from the negative lead to the ungrounded side of C38.
The channel oscillator adjustment screws are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. Amp. thru 10KΩ to point (A) Low side to chassis	A15	Use high scope gain to view sound trap. Adjust to place sound marker in trap notch. Reduce scope gain and attenuate sweep generator output for 2 volts peak to peak on scope. Video marker should fall at 20 to 40% on response curve as shown in Fig. 8.
			213MC (10MC Swp)	211.25MC 215.75MC	13		A16	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A17	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A18	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A19	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A20	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A21	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A22	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A23	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A24	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A25	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A26	

RF AND MIXER ALIGNMENT (TUNER #470696 USED ON VHF CHASSIS 120304-B AND 120305-B)

Leave the bias battery connected as under "Oscillator Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Normally the 40MC trap (A30) is set for maximum capacitance (screw fully clockwise). Should a nearby transmitter cause interference on channel 2, A30 may be adjusted in the field to minimize this interference.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	13	Vert. Amp. thru 10KΩ to point (A). Low side to chassis	A37, A38, A39	Adjust for response similar to Fig. 6 with markers above 90%.
13.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13			Check for response similar to Fig. 6. If markers fall below 70% on any channel make compromise adjustments of A37, A38 and A39 with channel switch set to that channel. Recheck all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

OSCILLATOR ALIGNMENT (TUNER #470712 USED ON UHF-VHF CHASSIS 120179-B AND 120203-B)

Complete oscillator alignment may not be necessary. If the oscillator seems to be off frequency approximately the same amount for a majority of the stations, it may be possible to correct them in one step using A14. It should be noted that A14 is an all channel oscillator circuit adjustment and should not be used to correct any individual channel. If adjustment of A14 will not bring all channels well within the range of the fine tuning control it will be necessary to adjust the channel strip adjustment for each channel that is off frequency.
For the remaining portion of this alignment, follow the procedure outlined under "Oscillator Alignment (tuner #470696 used on VHF Chassis 120304-B and 120305-B)".

RF AND MIXER ALIGNMENT (TUNER #470712 USED ON UHF-VHF CHASSIS 120179-B AND 120203-B)

With the exception of A30, which is omitted in this tuner, the RF and Mixer alignment is identical to that given for tuner #470696. Follow the procedure outlined under "RF and Mixer Alignment (Tuner 120204-B and 120205-B)".

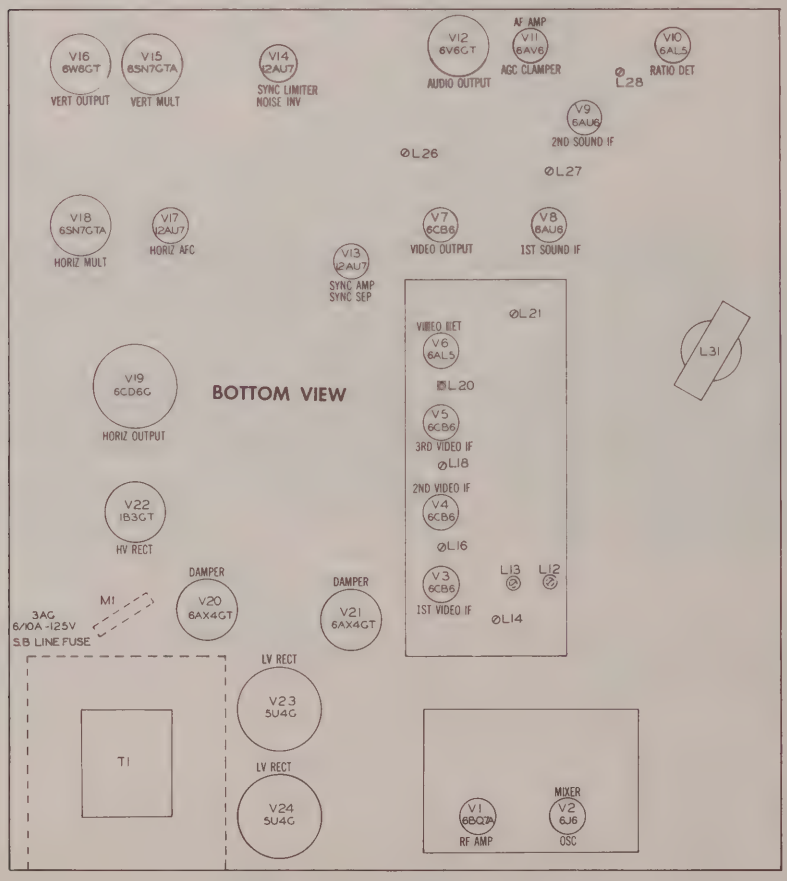
UHF TUNER ALIGNMENT

Complete tuner alignment should not be attempted in the field. If the UHF oscillator tube (6J6) is replaced it may be necessary to retouch A3L. Adjust A3L to track the highest UHF channel available in that area. If the output IF transformer (A33) has been tampered with, readjust A33 for best picture and sound on all UHF channels received in that area.
When returning a UHF tuner to the distributor for repair or replacement, the extension shaft and pulley should be removed and retained since the replacement unit will not come equipped with these devices. For the same reason remove and retain the VHF-UHF switch and front plate, which consists of a pulley and gear combination, when returning the VHF tuner.
Never return both VHF and UHF tuners as a unit.

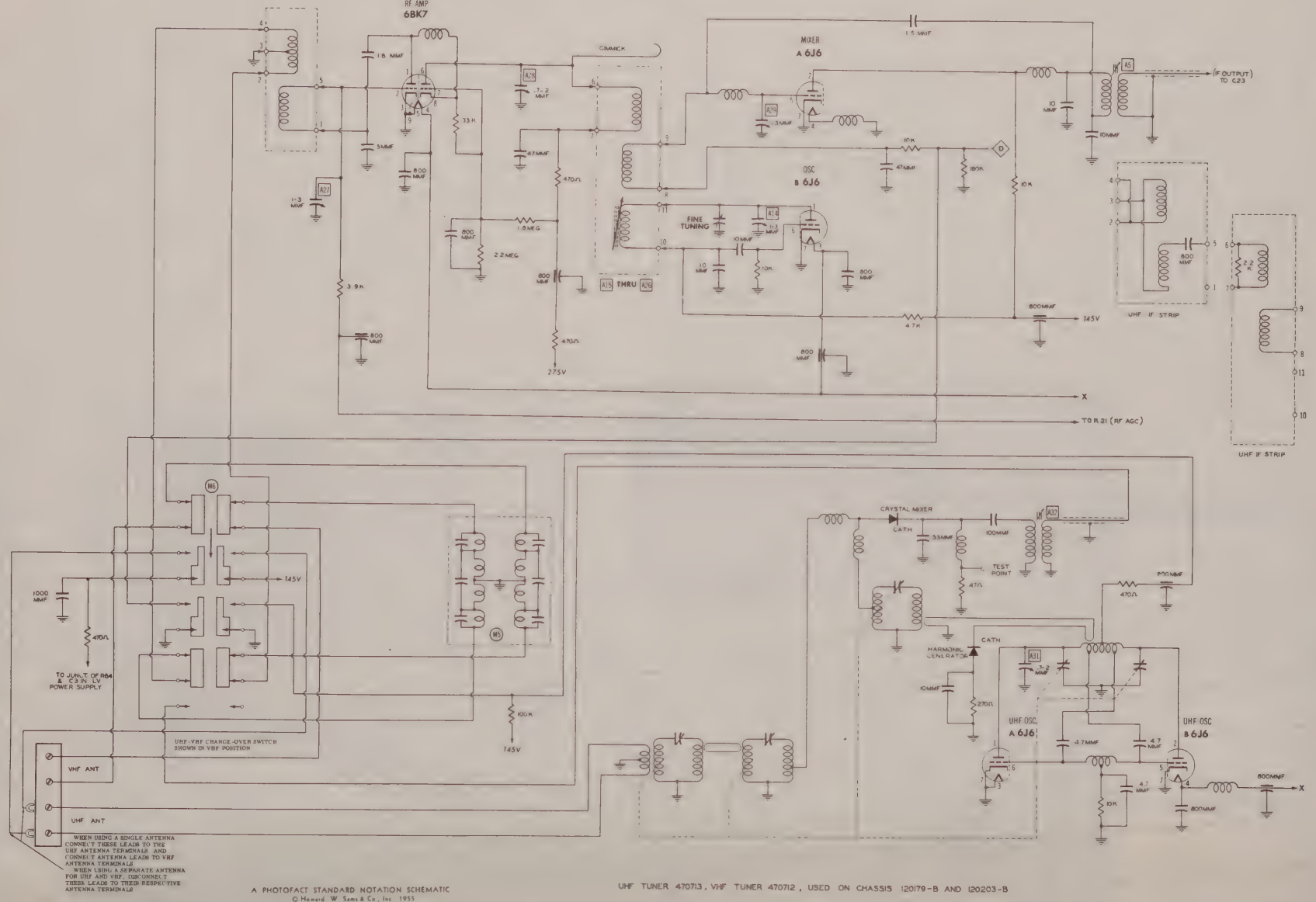
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7A	INF	1.8Meg	0Ω	.1Ω	0Ω	†1KΩ	†250KΩ	INF	0Ω
V 2	6J6	†6.5KΩ	†17KΩ	.1Ω	0Ω	235KΩ	10KΩ	0Ω		
V 3	6CB6	900KΩ	47Ω	.1Ω	0Ω	†2.3KΩ	†2.3KΩ	0Ω		
V 4	6CB6	900KΩ	47Ω	.1Ω	0Ω	†2.3KΩ	†2.3KΩ	0Ω		
V 5	6CB6	.1Ω	180Ω	.1Ω	0Ω	†2.3KΩ	†2.3KΩ	0Ω		
V 6	6AL5	.1Ω	1Meg	.1Ω	0Ω	100KΩ	0Ω	5KΩ		
V 7	6CB6	1Meg	320Ω	.1Ω	0Ω	†6.8KΩ	†1.8KΩ	320Ω		
V 8	6AU6	1Meg	0Ω	0Ω	.1Ω	†2.3KΩ	†2.3KΩ	270Ω		
V 9	6AU6	47KΩ	0Ω	0Ω	.1Ω	†2.3KΩ	†16KΩ	0Ω		
V 10	6AL5	0Ω	100KΩ	0Ω	.1Ω	200KΩ	6Ω	100KΩ		
V 11	6AV6	10Meg	0Ω	0Ω	.1Ω	1.7Meg	1.7Meg	†220KΩ		
V 12	6V6GT	INF	.1Ω	†1.8KΩ	†1.5KΩ	470KΩ	130KΩ	0Ω	470Ω	
V 13	12AU7	†32KΩ	15KΩ	0Ω	.1Ω	.1Ω	†15KΩ	2.3Meg	0Ω	0Ω
V 14	12AU7	†150KΩ	2.2Meg	▲20KΩ	0Ω	0Ω	2.2Meg	470KΩ	0Ω	.1Ω
V 15	6SN7GT	100KΩ	†150KΩ	2.2KΩ	1.4Meg	†1.7Meg	2.2KΩ	.1Ω	0Ω	
V 16	6W6GT	INF	0Ω	†300Ω	†400Ω	2.2Meg	†800KΩ	.1Ω	1KΩ	
V 17	12AU7	22KΩ	300KΩ	100KΩ	0Ω	0Ω	†6.5KΩ	330KΩ	4.7KΩ	.1Ω
V 18	6SN7GT	2.7Meg	†25KΩ	1.2KΩ	160KΩ	†350KΩ	1.2KΩ	.1Ω	0Ω	
V 19	6CD6G	INF	0Ω	100Ω	†6.8KΩ	470KΩ	100Ω	.1Ω	†6.8KΩ	TOP CAP ▲13Ω
V 20	6AX4GT	▲11.5Ω	0Ω	30KΩ	INF	†53Ω	INF	.1Ω	0Ω	
V 21	6AX4GT	INF	INF	30KΩ	INF	†53Ω	INF	.1Ω	0Ω	
V 22	1B3GT		PINS	1 - 8	HAVE	INF	RESISTANCE			TOP CAP ▲413Ω
V 23	5U4G	INF	15KΩ	INF	24Ω	6.5Ω	24Ω	INF	15KΩ	
V 24	5U4G	INF	15KΩ	INF	23Ω	INF	23Ω	INF	15KΩ	
V 25	27RP4	0Ω	0Ω	PIN 10 ▲780KΩ	PIN 11 †250KΩ	PIN 12 .1Ω				

† MEASURED FROM PIN 8 OF V23
▲ MEASURED WITH FRINGE COMPENSATOR SWITCH IN "OFF" POSITION
▲ MEASURED FROM PIN 3 OF V20



TUBE PLACEMENT CHART



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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UHF TUNER 470713, VHF TUNER 470712, USED ON CHASSIS 120179-B AND 120203-B

ALTERNATE TUNER SCHEMATIC

PROPERTY OF
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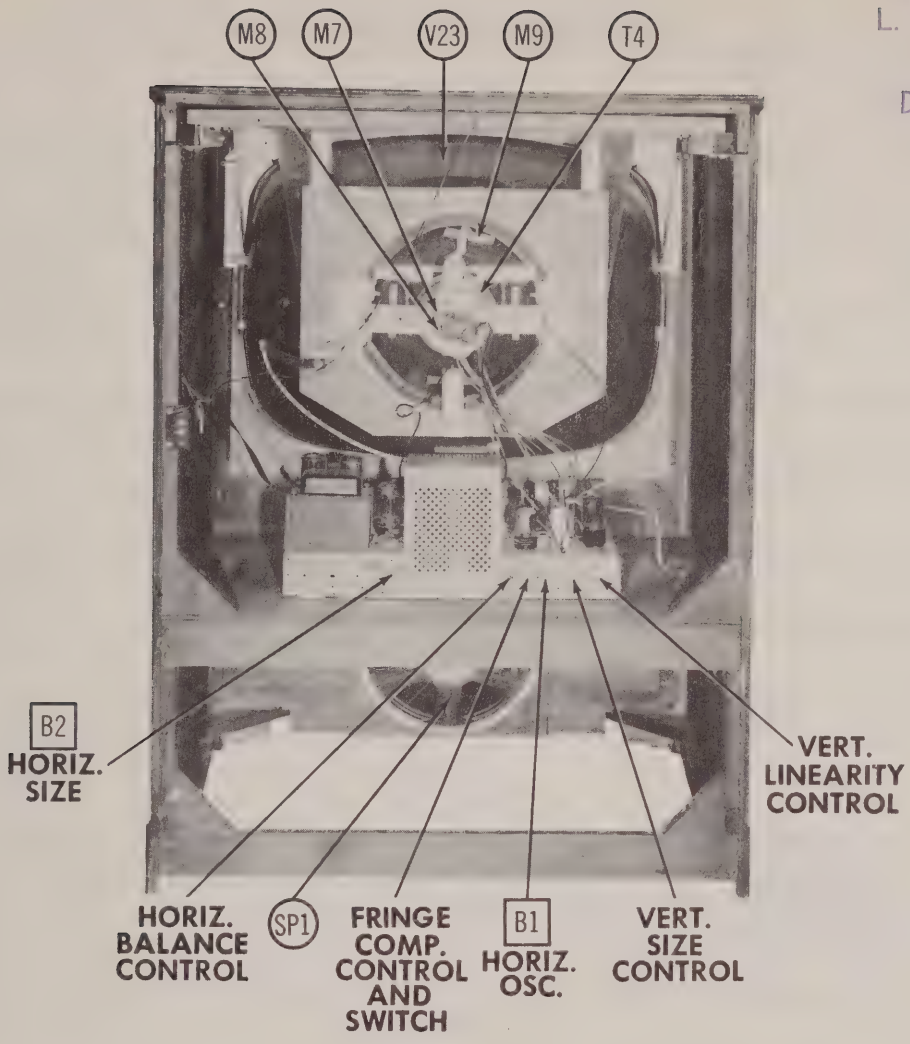
3924 MEADE ST.
DENVER, COLORADO



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Turn the fringe compensator switch maximum counter clockwise to "off" position.

1. Turn the horizontal hold control to its mid-range position.
2. Short the horizontal oscillator coil (L29) by means of a clip lead from the yellow to the white wire on the terminal strip on top of chassis near V18.
3. Short horizontal control grid (pin 1) of V18 to chassis (green wire on same terminal strip as in step 2).
4. Adjust horizontal balance control on rear of chassis until picture pulls into sync (picture may sway from side to side).
5. Remove short from horizontal oscillator coil (L29) and adjust the horizontal oscillator slug (B1) for the same synchronous condition as in step 4.
6. Remove short from horizontal control grid (pin 1 of V18).
7. Momentarily remove signal by switching off channel and back again. If picture does not fall in sync, readjust horizontal hold control until picture falls in sync after momentary removal of signal.

Adjust the horizontal size slug (B2) for a picture slightly wider than necessary to fill the picture mask horizontally.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V19, V20, V21, V23 and V24. Check adjustment B2. Check R114, R112, C87, T2, T4A and other associated components.

DRIVE LINES

Check by substitution V19, V20 and V21. Check C87, C85, C86, R109, T2, T4A and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V19, V20 and V21. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V18, V19, V20 and V21. Check C81 for open. Check C82, R104 and other associated components.

XMAS TREE EFFECT

Check by substitution V18, V19, V20 and V21. Check T2 and T4A for internal arcing. Check L29, C83, C84, R104, R108 and other associated components.

VERTICAL

LOSS OF SWEEP

Check by substitution V15 and V16. Check waveform W9.

If Satisfactory	If Unsatisfactory
Check T3, T4B, R92, R91, R5, C2C and other associated components.	Check C71, C68, C69, R88, R87, R85 and other associated components.

INSUFFICIENT SWEEP

Check by substitution V15 and V16. Check vertical size and vertical linearity controls for proper operation. Check T3 and T4B.

COMPRESSED AT BOTTOM

Check by substitution V15 and V16. Check R88, R87, R6, C71 and other associated components.

COMPRESSED AT TOP

Check by substitution V15 and V16. Check C2C, R5, R91, T3, T4B and other associated components.

FOLDS

Check by substitution V15 and V16. Check C70, C71, R89, T3, T4A and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V13 and V14. Check C60, C59, C62, C63, R68, R72, R77 and other associated components.

LOSS OF VERTICAL SYNC - HORIZONTAL SYNC SATISFACTORY

Substitute V15. Check C68, C67, C69, R85, R84, R86, R3 and other associated components.

LOSS OF HORIZONTAL SYNC - VERTICAL SYNC SATISFACTORY

Check by substitution V17 and V18. Check C73, C74, C84, R97, R104, R8, R4, L29 and other associated components.

HORIZONTAL BENDING

Check by substitution V13, V14, V17 and V18. Check horizontal AFC network.

VIDEO

LOSS OF VIDEO

Substitute V7. Check C41, C43, C44, L26, L24, L23, L25, R37 and other associated components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check video IF alignment. Check adjustment A13.

POOR CONTRAST

Substitute V7. Check contrast control, picture tube and other components associated with V7. Check video detector network.

NEGATIVE PICTURE

Substitute V7. Check picture tube. Check video detector network. Check C41, C43, L23, L22, L24 and other associated components.

SMEAR

Substitute V7. Check L22, L23, L24, L26, C44, C43, C41 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V5, V6 and V7 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V8, V9, V10, V11 and V12. Check stages V11 and V12 using audio signal generator. Apply audio signal across R1B.

If Satisfactory	If Unsatisfactory
Check audio detector and audio IF stages for component failure or change of value.	Check C55, C57, C58, C56, R61, R58, R60, T6, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustment A12. If still unsatisfactory, check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly. Check switch on volume control and T1. If filaments light, check by substitution V23 and V24. Check B+ filter and decoupling network for component failure or change of value. Check M1 fuse.

SMALL AND/OR DIM PICTURE

Check by substitution V23 and V24. Check B+ filter and decoupling network.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: EMERSON PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amp.	6BQ7A	6BQ7A	9AJ	6BA7 or 6BZ7 used in some versions.
V2	Mixer Osc.	6J6	6J6	7BF	
V3	1st Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Det-AGC Rectifier	6AL5	6AL5	6BT	
V7	Video Output	6CB6	6CB6	7CM	
V8	1st Sound IF	6AU6	6AU6	7BK	
V9	2nd Sound IF	6AU6	6AU6	7BK	
V10	Discriminator	6AL5	6AL5	6BT	
V11	AF Amp-AGC Clamper	6AV6	6AV6	7BT	
V12	Audio Output	6V6GT	6V6GT	7S	
V13	Sync Amp-Sync Sep.	12AU7	12AU7	9A	
V14	Sync Limiter Noise Inverter	12AU7	12AU7	9A	
V15	Vert. Mult.	6SN7GT	6SN7GT	8BD	
V16	Vert. Output	6W6GT	6W6GT	7S	
V17	Horiz. Phase Det-Horiz. AFC	12AU7	12AU7	9A	
V18	Horiz. Mult.	6SN7GT	6SN7GT	8BD	
V19	Horiz. Output	6CD6G	6CD6G	5BT	
V20	Damper	6AX4GT	6AX4GT	4CG	One 6AU4GT used in some versions.
V21	Damper	6AX4GT	6AX4GT	4CG	
V22	HV Rectifier	1B3GT	1B3GT	3C	
V23	LV Rectifier	5U4G	5U4G	5T	
V24	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: EMERSON PART No.	CBS-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V23	27RP4 27EP4	27RP4 27EP4	27RP4 27EP4	27RP4 27EP4		12N 12D	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: EMERSON PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	80	400	925237	AFH2-64		B048		FP377	TVL-3792	Blue
B	40	400		PRS450/40		BR445		TC70		Green
C	5	450								Red
C2A	40	300	925236	AFH4-87		C037			TVL-3792	Blue
B	80	400		PRS450/40		BRH501			TVA-1310	Red
C	100	50								Green
D	10	400								
C3	10	25	925180	PRS25/10		BR102		TC22	TVA-1204	
C4	3-8		960635		829-10					
C5	3-8		960635		829-10					
C6	1000		960407	EF-001	MFT-1000				503C-D1	
C7	3.3		960638	SI3.3NP0	TCZ-3.3	Z008	NP0K-3R3	ZT-5533	5TCCB-V3	
C8	1000		960407	EF-001	MFT-1000				503C-D1	
C9	.5-3		960634		829-3		3115-01-0R5	CT565A		
C10	120		960136	BPD-121	DD-121	G044	801-121	UC-5312	5GA-T12	
C11	1000		960407	EF-001	MFT-1000				503C-D1	
C12	1500		960138	BPD-0015	DD-152	K071	801-0015	DC- 5215	5HK-D15	
C13	51			BPD-510	D6-510	G035	GP1K-510	UC-545	5GA-Q51	
C14	.5-3		960634		829-3		3115-01-0R5	CT565A		
C15	10		960636	SI10NP0	TCZ-10	Z018	NP0K-100	ZT-541	5TCC-Q1	
C16	9		960637			N017				
C17	1500		960138	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C18	6.8		960639	SI6.8NP0	TCZ-6.8	Z013	NP0K-6R8	ZT-5568	5TCCB-V6.8	
C19	1500		960138	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C20	1500		960138	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C21	1000		960407	EF-001	MFT-1000				503C-D1	
C22	1000		960407	EF-001	MFT-1000				503C-D1	
C23	5000		928109	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C24	39		928082	SI39N750	TCN-39	N031	N750K-39		5TCU-Q39	
C25	6.8		928084			N013				
C26	1000		928077	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C27	470		928081	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C28	1000		928077	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C29	.22	200	922325	P288-22		CUB2P22		PT4022	2TM-P22	
C30	470		928081	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C31	1000		928077	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C32	5000		928109	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C33	680		928076	SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C34	680		928076	SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C35	1000		928077	BPD-001	DD-102	K069	801-001	DC-521	5HK-D5	
C36	22		928012	SI22	D6-220	TP22	GP1K-220	UC-5422	5GA-Q22	
C37	1000		928077	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C38	.22	200	922325	P288-22		CUB2P22		PT4022	2TM-P22	
C39	1000		928077	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C40	5		928017	SI5NP0	TCZ-5	Z011	NP0K-050	ZT-555	5TCCB-V47	
C41	.047	400	922554	P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C42	1000		928077	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C43	.047	400	922554	P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C44	47			SI47NP0	TCZ-47	TZ22	NP0K-470	ZT-5447	5TCC-Q47	
C45	.01	600	922714	P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C46	5000		928109	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C47	5000		928109	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C48	5000		928109	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C49	5000		928109	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C50	68	500	911181	1468-680	D6-680	5W5Q68	GP1K-680	UC-5468	1FM-47	
C51	5000		928109	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C52	5000		928109	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	

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3924 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No	RATING CAP	RATING VOLT	REPLACEMENT DATA EMERSON PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C53	100	500	911182	1468-101	D6-101	SWST1	GPIK-101	MC335	1FM-51	
C54	.0022	400	922523	P468-0022	D6-222	CUBD5B2	GP2-333-222	PT6232	6TM-D23	
C55	.0047	400	922553	P468-0047	D6-472	CUBD4D7	GP2-333-472	PT6247	6TM-D47	
C56	.001	400	922518	P468-001	D6-102	CUBD5D1	GP2L-102	PT6211	6TM-D1	
C57	.047	400	922554	P468-047	DF-503	CUBD4B47		PT6147	4TM-S47	
C58	.0047	400	922753	P468-0047	D6-472	CUBD4D7	GP2-333-472	PT6247	6TM-D47	Note 1
C59	.01	400	922514	P468-01	D6-103	CUBD4B1	GP2L-103	PT611	4TM-S1	
C60	100	1000	911488		DD80-101	VT1	GA5KV-101		10CA-T1	
C61	.33	200	922325	P288-33		SWB2GP32		PT4033	2TM-P33	
C62	.1	200	922315	P288-1	DF-104	CUBB2P1		PT401	2TM-P1	
C63	.01	400	922314	P468-01	D6-103	CUBD4B1	GP2-333-103	PT611	4TM-S1	
C64	330	500	911184	1468-331	DF-331	SWST32	GP2K-321	UC-5323	5CA-T23	
C65	.0033	400	922523	P468-0022	D6-222	CUBD5B22	GP2-333-222	PT6223	6TM-D23	
C66	.0047	400	922553	P468-0047	D6-472	CUBD4D7	GP2-333-472	PT6247	6TM-D47	
C67	.01	400	922514	P468-01	D6-103	CUBD4B1	GP2-333-103	PT611	4TM-S1	
C68	.0047	400	922453	1464-472		IRSD47		MC3465	MS-35	
C69	.047	200	922354	P288-047	DF-503	CUBB247		PT7347	2TM-P47	
C70	.047	400	922454							
C71	.1	200	922315	P288-1	DF-104	CUBB2P1		PT601	6TM-P1	
C72	.01	400	922714	P468-01	D6-103	CUBD4B1	GP2-333-103	PT611	6TM-S1	
C73	82	500	911180	1468-820	TC2-82	22R5G82	MP0-337-820			
C74	680	500	913176	1468-681		SR6T68			MS-37	
C75	470	500	911169	1468-471		SR6T47		MC3245	MS-35	
C76	.001	400	922513	P468-001	D6-102	CUBD5D1	GP2L-102	PT6211	6TM-D1	
C77	.001	400	922513	P468-001	D6-102	CUBD5D1	GP2L-102	PT6211	6TM-D1	
C78	.0022	400	922523	P468-0022	D6-222	CUBD5D22	GP2-333-222	PT6223	6TM-D23	
C79	.001	1000	922513	P1068-001	DD6E-102	CUBD5E1	1R5KV-102	PT7E11	MB-D1	Note 4
C80	.001	400	922513	P468-001	D6-102	CUBD5D1	GP2L-102	PT6211	6TM-D1	
C81	.015	300	923320	P288-015		CUBB5G3		PT6115	4TM-S15	
C82	100	500	911181	1468-101	TC2-100	SR5T1	MP0-337-101	MCB235	MS-31	
C83	.0047	500	922653	1464-472		SR5T47		MCB465	MS-35	
C84	220	500	911185	1468-221		SR5T22	MP0-338-221	MCB2245	5TC-T22	
C85	390	500	911186	1468-391		SR5T39		MCB243	MS-34	
C86	.015	300	922320	P288-015		CUBB5I5		PT6115	4TM-S15	
C87	.001	400	922513	P468-001	D6-102	CUBD5D1	GP2L-102	PT6211	6TM-D1	
C88	.1	400	922515	P468-1	DF-104	CUB4P1		PT401	4TM-P1	
C89	.47	200	922355	P288-47		CUBB2P47		PT4047	2TM-P47	
C90	100	4000	928116						50GA-T1	Note 2
C91	.1	600	922715	P888-1	DF-104	CUB6P1		PT601	6TM-P1	Note 3
C92	500	20000				MMU10P5			20DK-T5	
C93	.068	1000	922974	P1068-068		FM10S68			10TM-S68	
C94	100	1000	928081							
C95	.05	400	922100	P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C96	.05	400	922200	P488-05	DF-503	CUB4S5		PT415	4TM-S5	

Note 1, Chassis 120203-B ⚠ and 120204-B ⚠ use 600V unit in this application.
Note 2, Used only on chassis 120179-B ⚠ , 120205-B ⚠ , 120203-B and 120204-B.
Note 3, Not used when picture tube has outer coating.

CONTROLS

ITEM No	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA EMERSON PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1500Ω	½	390201	*QJ-313	RTV-396	BBB-701-S	UV152L	Contrast - Panel
B	1Meg						UR5LA	Volume - Rear
C	Switch						US-26	Attach to R1B
R2A	200KΩ	½	390181	Q11-129	A47-200K-S	AB-48	U-43	Brightness
B	Shaft		Not Req.	C3	KS8-5	AK-4	DS-26	Attach to R2A
R3A	1Meg	½	390156	Q11-127	A47-1Meg-S	AB-59	U-54	Vertical Hold
B	Shaft		Not Req.	C3	KS8-5	AK-4	DS-26	Attach to R3A
R4A	50KΩ	½	390183	Q11-123	A47-50K-S	AB-31	U-35	Horizontal Hold
B	Shaft		Not Req.	C3	KS8-5	AK-4	DS-26	Attach to R4A
R5A	5000Ω	2	390197	WK-5000	A43-5000	VK-135	R5000L	Vert. Linearity Wire-wound
B	Shaft		Not Req.	Not Req.	FK3-1/4	Not Req.	Not Req.	Attach to R5A
R6A	2Meg	½	390196	Q11-139	A47-2Meg-S	AB-75	BU-56	Vertical Size
B	Shaft		Not Req.	Not Req.	FK3-1/4	AK-1	Not Req.	Attach to R6A
R7A	50KΩ	½	390225	Q11-123	A47-50K-S	AB-31	U-35	Fringe Compensator
B	Shaft		Not Req.	Not Req.	FK3-1/4	AK-1	Not Req.	Attach to R7A
C	Switch		Not Req.	78-1	SWK-12	KB-1	US-26	Attach to R7A
R8A	200KΩ	½	390219	Q11-129	A47-200K-S	AB-48	U-43	Horizontal Balance
B	Shaft		Not Req.	Not Req.	FK3-1/4	AK-1	Not Req.	Attach to R8A

* CONCENTRIKIT EQUIVALENT: KIT K-2, BASE ELEMENTS & SHAFTS: B1T-110 & P1-324 (PANEL)
B1S-137 & R1-308 (REAR)
76-1 SWITCH

† Universal replacement (Mallory exact duplicate part no. UR205S).

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA EMERSON PART No.	IRC PART No.	NOTES
R1	15KΩ	½		BTS-15K	
R10	47KΩ	½		BTS-47K	
R11	100KΩ	½		BTS-100K	
R12	330KΩ	½		BTS-330K	
R13	180KΩ	½		BTS-180K	
R14	470Ω	½		BTS-470	
R15	10KΩ	½		BTS-10K	
R16	4700Ω	½		BTS-4700	
R17	15KΩ	½		BTS-15K	
R18	220KΩ	½		BTS-220K	
R19	15KΩ	½		BTS-15K	
R20	470Ω	½	350412	BTS-470	
R21	470Ω	½	350412	BTS-470	
R22	15Ω	½	340052	BTS-15	
R23	47Ω	½	340172	BTS-47	
R24	470Ω	½	350412	BTS-470	
R25	470Ω	½	350412	BTS-470	
R26	470Ω	½	350412	BTS-470	
R27	27KΩ	½	340832	BTS-27K	
R28	47Ω	½	340172	BTS-47	
R29	470Ω	½	350412	BTS-470	
R30	8200Ω	½	340712	BTS-8200	
R31	180Ω	½	340312	BTS-180	
R32	470Ω	½	350412	BTS-470	
R33	1Meg	½	351212	BTS-1Meg	
R34	500KΩ	½	350972	BTS-500K	
R35	1Meg	½	351212	BTS-1Meg	
R36	22KΩ	½	340812	BTS-22K	
R37	6800Ω 5%	2	770692	BTS-6800 5%	
R38	470KΩ	½	351132	BTS-470K	
R39	220KΩ	½	350052	BTS-220K	
R40	470KΩ	½	351132	BTS-470K	
R41	680KΩ	½	351172	BTS-680K	
R42	1Meg	½	351212	BTS-1Meg	
R43	1Meg	½	351212	BTS-1Meg	
R44	15KΩ	½	340772	BTS-15K	
R45	47Ω	½		BTS-47	
R46	220Ω	½	340332	BTS-220	
R47	470Ω	½	350412	BTS-470	
R48	47KΩ	½	350892	BTS-47K	
R49	6800Ω	½	340692	BTS-6800	
R50	470Ω	½	350412	BTS-470	
R51	1Meg	½	351212	BTS-1Meg	
R52	10KΩ	½	340732	BTS-10K	
R53	22KΩ	½	370812	BTA-22K	
R54	100KΩ	½	340972	BTS-100K	
R55	100KΩ	½	340972	BTS-100K	
R56	68KΩ	½	350932	BTS-68K	

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA EMERSON PART No.	IRC PART No.	NOTES
R57	10Meg	½	351452	BTS-10Meg	
R58	220KΩ	½	351252	BTS-220K	
R59	470KΩ	2	351332	BTS-470K	
R60	470Ω	1	370412	BTA-470	
R61	1500Ω	2	790532	BTS-1500	
R62	10Meg	½	351452	BTS-10Meg	
R63	6.8Ω	½	394135		
R64	22KΩ	½	340812	BTS-22K	
R65	10KΩ	½	340732	BTS-10K	
R66	4700Ω	½	340852	BTS-4700	
R67	22KΩ	1	370812	BTA-22K	
R68	10KΩ	½	340732	BTS-10K	
R69	33KΩ	½	340852	BTS-33K	
R70	2.2Meg	½	351292	BTS-2.2Meg	
R71	100KΩ	½	350972	BTS-100K	
R72	22KΩ	1	370812	BTA-22K	
R73	470KΩ	½	341132	BTS-470K	
R74	2.2Meg	½	351292	BTS-2.2Meg	
R75	10KΩ	½	340732	BTS-10K	
R76	10KΩ	½	340732	BTS-10K	
R77	150KΩ	½	341012	BTS-150K	
R78	68KΩ	½	340932	BTS-68K	
R79	5600Ω	½	340672	BTS-5600	
R80	3900Ω	½	340392	BTS-390	
R81	22KΩ	½	340812	BTS-22K	
R82	82000Ω	½	340712	BTS-8200	
R83	100KΩ	½	350972	BTS-100K	
R84	2300Ω	½	340572	BTS-2300	
R85	150KΩ	½	340012	BTS-150K	
R86	820KΩ	½	341932	BTS-820K	
R87	1Meg	½	351212	BTS-1Meg	Note 1
R88	47KΩ	½	350892	BTS-47K	
R89	12KΩ	½	340752	BTS-12K	
R90	2.2Meg	½	351292	BTS-2.2Meg	
R91	470Ω	½	370412	BTA-470	Note 3

Note 1: Chassis 9130903-B ⚠ , 120204-B ⚠ , use a 1.5Meg in this application.
Note 2: Some versions may use a ½ watt resistor in this application.
Note 3: Chassis 120179-B ⚠ , 120205-B use a 1 watt resistor in this application.
Note 4: Chassis 120179-B ⚠ , 120205-B ⚠ , 120203-B, 120204-B use a 220KΩ resistor in this application.
Note 5: In chassis 120205-B ⚠ , R134 is omitted.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA EMERSON PART No.	Stancor PART No.	Merit PART No	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @ 2.37A	556VCT .350ADC ⑤	5VAC @ 6A	730041	730041 ①	P-8167 ②	P-3056 ③		P9739 ② ③	
	SEC. 3	SEC. 4	SEC. 5							
	12.6VCT @ 1A									

① Power transformer used in chassis 120203-B,and 120204-B
② Drill new mounting holes.
③ Series 6.3V windings to get 12.6VCT for sec. #3.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA EMERSON PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T2	Horiz. Output Trans.	738078 ① 738087 ②			D-50 & * WC-12 ③	2357T & 215R1 ③		FLY-18 & WC-18 ④ ③
T3	Vert. Output Trans.	738078	A-8143 ③ A-1083 ④					26873 ⑤
T4A	Yoke (90°)- Horiz. (21.5MH)	708174						Y-16
B	Vert. (42MH)							
T5	Width Coil (1-8MH)	708088	WC-8	MWC-6 ②	WC-12 ⑦	211R1		WC-18 ②
		708168 ②	WC-8	MWC-6 ③	WC-12 ⑦	211R1		WC-18 ③

① For chassis 120179-B & 120205-B.
② For chassis 120203-B & 120204-B.
③ Drill new mounting holes.
④ Connect as auto trans.
⑤ Alternate width coil.
⑥ Enlarge mounting hole.
⑦ Connect to coded blue & green terms.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Stancor Replacement Connections	Merit Replacement Connections	Triad Replacement Connections	RCA Replacement Connections	Halldorson Replacement Connections	Thordarson Replacement Connections
3			HV Rect. Plate Lead	HV Rect. Plate Lead		HV Rect. Plate Lead
2			9	9		9
4			7	7		7
5			4	4		7
6 (NC)			NC	NC		NC
8			3	3		3
1			1	1		1
Connect Width Coil Across →	8 & 1		WC-12 Red & Blue Terminals 3 & 1	215R1 3 & 1		WC-18 3 & 1
Special Notes →			⑥	⑥		⑥

⑥ Remove blue lead from yoke. Connect R123 in series with C94 across terms #3 & #2 or #7 of yoke.

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE PRI	IMPEDANCE SEC	REPLACEMENT DATA EMERSON PART No	Stancor PART No	Merit PART No	Triad PART No	Halldorson PART No	Thordarson PART No	NOTES
T6	4.6KΩ	3.4Ω	734074	A-3877 ①	A-3019	S-3X ①	ZU07 ①	26849	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA EMERSON PART No	VIKING PART No.	QUAM PART No.	NOTES
SP1	12"	PM	3.4Ω	180120	12J11	12A31	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI	DC RES. SEC	REPLACEMENT DATA EMERSON PART No	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	1F Trap Coil	0Ω						Wound on 68MMF cap.
L2	1F Trap Coil	0Ω						Wound on 68MMF cap.
L3	Ant. Coil	0CCT	0Ω					
L4	1F Trap Coil	.8Ω						
L5	Fil. Choke	0Ω						
L6	Neut. Coil	0Ω						
L7	RF, Mixer Grid & Osc. Coils	0Ω						
L8	Fil. Choke	0Ω						
L9	Feedback Coil	L.1Ω						
L10	RF Choke	0Ω						
L11	Conv. Plate	0Ω	0Ω					
L12	Adj. Sound Trap	0Ω		720154	20-1047*		6310a	
L13	Sound Carrier Trap	0Ω		720149	20-1046		6310a 6311a	
L14	1st Video IF	.1Ω		720147 - Note 1			6311a	
L15	Fil. Choke	.44Ω		705020	19-3001	TV-189	6175	.68 Microhenries, IRC part no. CLA
L16	2nd Video IF	.1Ω	.1Ω	720146 - Note 2	17-4533		6319	
L17	Fil. Choke	.44Ω		705020	19-3001	TV-189	6175	.68 Microhenries, IRC part no. CLA
L18	3rd Video IF	.1Ω	.1Ω	720148 - Note 2	17-4533		6319	
L19	Fil. Choke	.44Ω		705020	19-3001	TV-189	6175	.68 Microhenries, IRC part no. CLA
L20	4th Video IF	.1Ω	.1Ω	720148 - Note 2	17-4533		6319	
L21	1st Sound IF	10Ω	2.2Ω	720146 - Note 3	16-3445	TV-113	6303	
L22	Shunt Peaking Coil	15Ω		708114	19-1823	TV-189	4566	440 Microhenries
L23	Series Peaking Coil	2.7Ω		705014	19-0022	TV-180	6153	20 Microhenries
L24	Series Peaking Coil	12Ω		708100	19-3250	TV-185	6181	250 Microhenries
L25	Shunt Peaking Coil	19Ω		708115	19-3060		4560	660 Microhenries
L26	4.5MC trap	L.9Ω		720932 - Note 6	20-1004	TV-151	1470	
L27	2nd Sound IF	L.5Ω	1.5Ω	720081 - Note 4	16-3445	TV-113	6303	
L28	Discriminator	L.6Ω	L.6CCT	708018 - Note 5	17-1033 ▲		6304	
L29	Horiz. Osc.	53Ω		710044	19-1576	TV-183	6310	
L30	RF Choke	8.2Ω		705031	19-1005		4853	10 Microhenries, IRC part no. CL-1

Note 1: Alternate part no. 720156.
Note 2: Alternate part no. 730175.
Note 3: Alternate part no. 730165.
Note 4: Alternate part no. 730182.
Note 5: Alternate part no. 708151 & 708175.
Note 6: Alternate part no. 708164.
* Disconnect 324MMF cap.
■ Use one winding only
▲ Drill one new mounting hole

FILTER CHOKE

ITEM No	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	RATINGS INDUCTANCE @ CURRENT 1000 ~(∿)	REPLACEMENT DATA EMERSON PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L31	.330ADC	45.2Ω	1.6HY	737018	C-2326 ①				C9037

① Drill one new mounting hole.

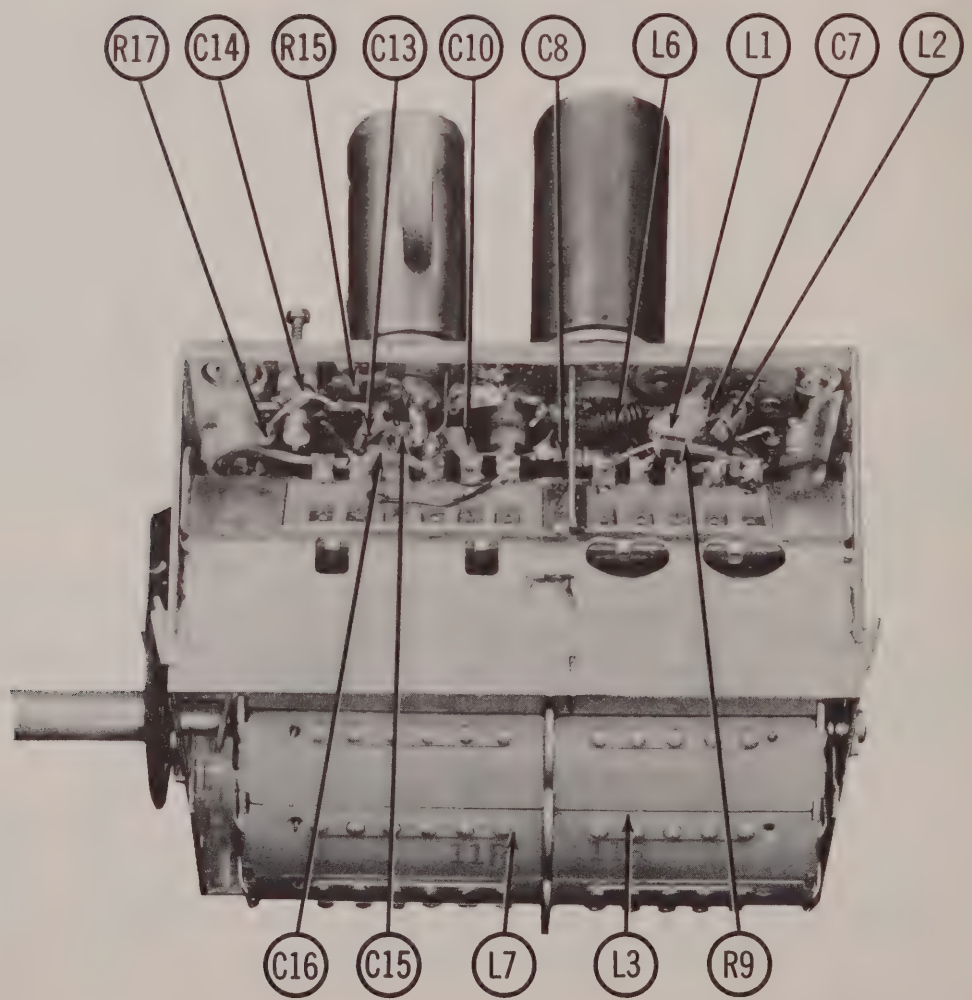
FUSES

ITEM No	TYPE	RATING	REPLACEMENT DATA EMERSON PART No. FUSE	EMERSON PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG S/B	6/10A - 125V	808005		313.600 (6/10A-3AG-S/B)	357001	MDL 6/10	4405

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	EMERSON PART No.	NOTES
M2	Dial Light	807000	#47, Bayonet - Chassis 120179-B & 120203-B only.
M3	Tuner	470696	VHF - Ch. 120204-B, 120205-B
	Tuner	470712	VHF - Ch. 120179B, 120203-B
M4	Tuner	470713	UHF - Ch. 120179B, 120203-B
M5	Trap	720173	VHF Ant. Input Filter, Ch. 120179-B & 120203-B only
M6	Switch		VHF-UHF - Part of VHF Tuner part #470712 used in chassis 120179-B and 120203-B only.
M7	Focus Magnet	708169	Includes centering device
M8	Ion Trap	*708129	*Alternate part #708161
M9	Correction Magnet	708168	4 used
	Cabinet	140515	Model 748B, 748C - Mahogany
	Cabinet	140579	Models 777B, 796C - Mahogany
	Cabinet	140579A	Models 777B, 796C - Blonde
	Cabinet	140559	Models 787A, 787B, 797B, 797C - Mahogany
	Cabinet	140559A	Models 787A, 787B, 797B, 797C - Mahogany
	Knob	460424	Contrast - Models 748B, 748C, 787A, 787B, 796C
	Knob	450138	Contrast - Models 777B, 797B, 797C, 798B
	Knob	460423	Fine tuning - Models 748B, 748C, 787A, 787B, 796C
	Knob	450137	Fine tuning - Models 777B, 797B, 797C, 798B
	Knob	460422	On-off-volume - Models 748B, 748C, 787A, 787B, 796C
	Knob	450134	on-off-volume - Models 777B, 797B, 797C, 798B
	Knob	460262	Flange - on-off-volume - Models 777B, 797B, 797C, 798B
	Knob	460421	Channel Selector - Models 748B, 748C, 787A, 787B, 796C
	Knob	450133	Channel Selector - Shank - Models 777B, 797B, 797C, 798B
	Knob	460261	Channel Selector - Flange - Models 777B, 797B, 797C, 798B
	UHF Dial	460425	Models 748B, 748C, 787A, 787B, 796C
	Dial Mask	565273	Models 748B, 748C, 787A, 787B, 796C
	Safety Glass	520198	All Models
	Mask	460441	All Models



RF TUNER RIGHT SIDE

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L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

TROUBLE SHOOTING AIDS (cont)

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V18, V19, V20, V21 and V22. Check waveform W16.

If Satisfactory	If Unsatisfactory
Check T2, T4A, T5, C91, C93, C88, R114, R113, R112 and other associated components.	Check L29, C83, C87, C84, C82, R104, R107, R103 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V19, V20, V21, V23 and V24. Check C87, C85, C89, R113, R114 and other associated components.

BLOOMING

Check by substitution V19, V20, V21, V22, V23 and V24. Check R124, R113, R114, C87 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5, V6 and V7. Check video IF components for failure or change of value.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

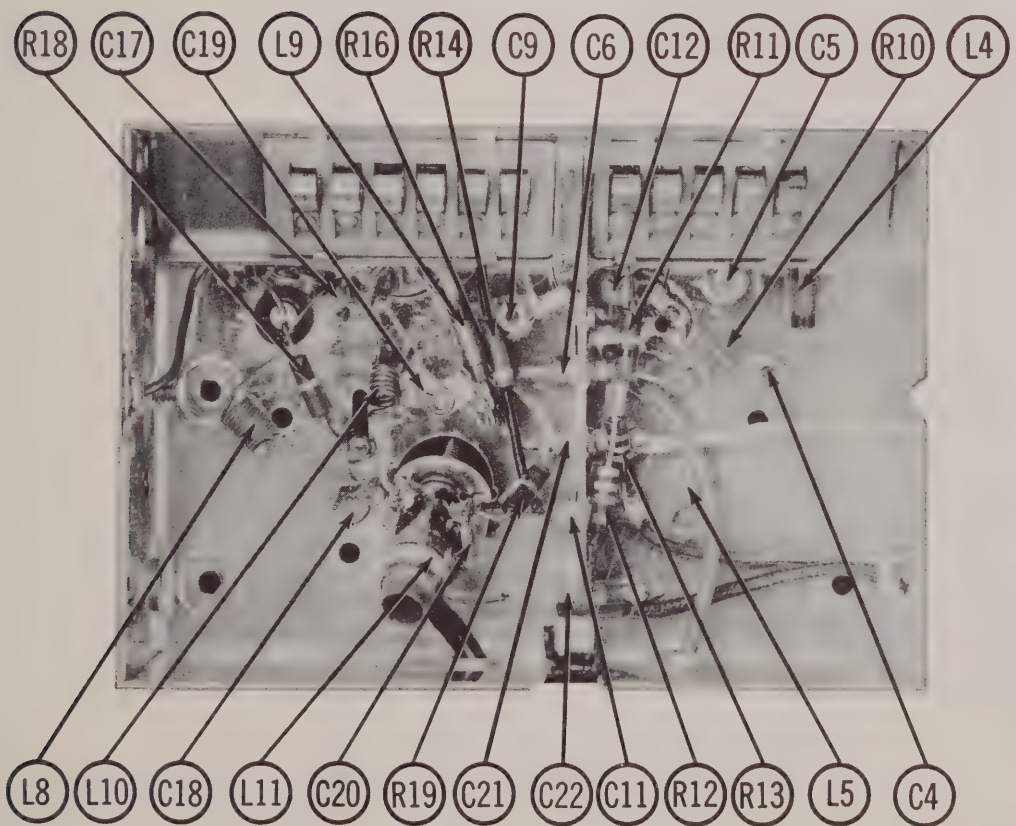
KEYSTONE EFFECT

Check T4 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



RF TUNER BOTTOM VIEW

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF Tuner Oscillator Circuit may be accomplished by removal of the Channel Selector and Fine Tuning knobs. The adjustments are accessible, one at a time, through the small hole in the cabinet to the right of the Channel Selector shaft.

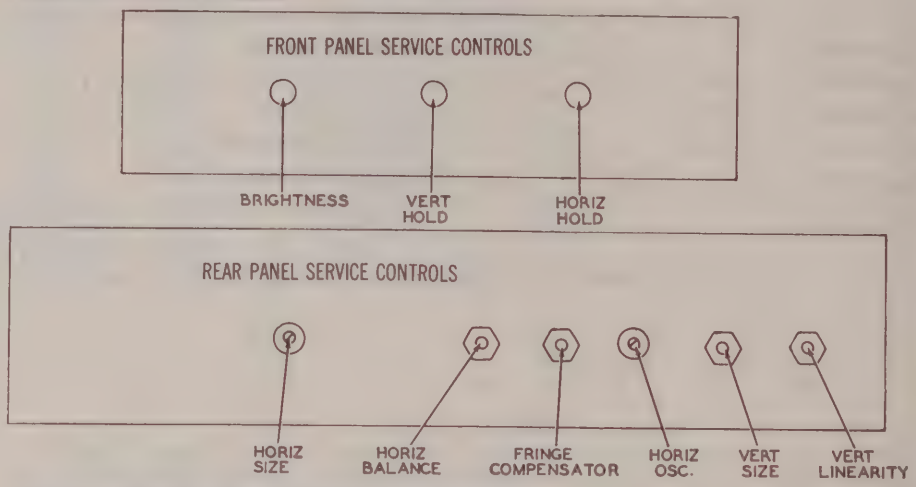
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove 16 wood screws from both side and top of safety glass molding. Remove molding and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions.)

SERVICE ADJUSTMENT LOCATION



SPECIAL ADJUSTMENTS - FRINGE COMPENSATOR ADJUSTMENT

Tune in the weakest TV signal available and adjust the fringe compensator control (R7A) for the most stable picture. Repeat procedure on all channels on which a TV station can be tuned in and adjust R7A as necessary for best overall picture stability. In strong signal areas the fringe compensator should be left in the "Off" position to prevent picture instability.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the Horiz. Oscillator Circuit can be made from the rear panel of the chassis. Set the Horiz. Hold Control at the Mid-position of its range and adjust the Horiz. Osc. slug (L29) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate Sound IF Detector Buzz, adjust the Discriminator Secondary L28 located on top of chassis. (See tube placement chart.)

FUSES

One fuse is used for L. V. Power Supply protection. (For location see Tube Placement Chart.)

CENTERING

Centering is accomplished mechanically by means of a centering lever on the P. M. Focusing assembly. Adjust the centering lever from side to side, and up and down until the picture is properly centered.

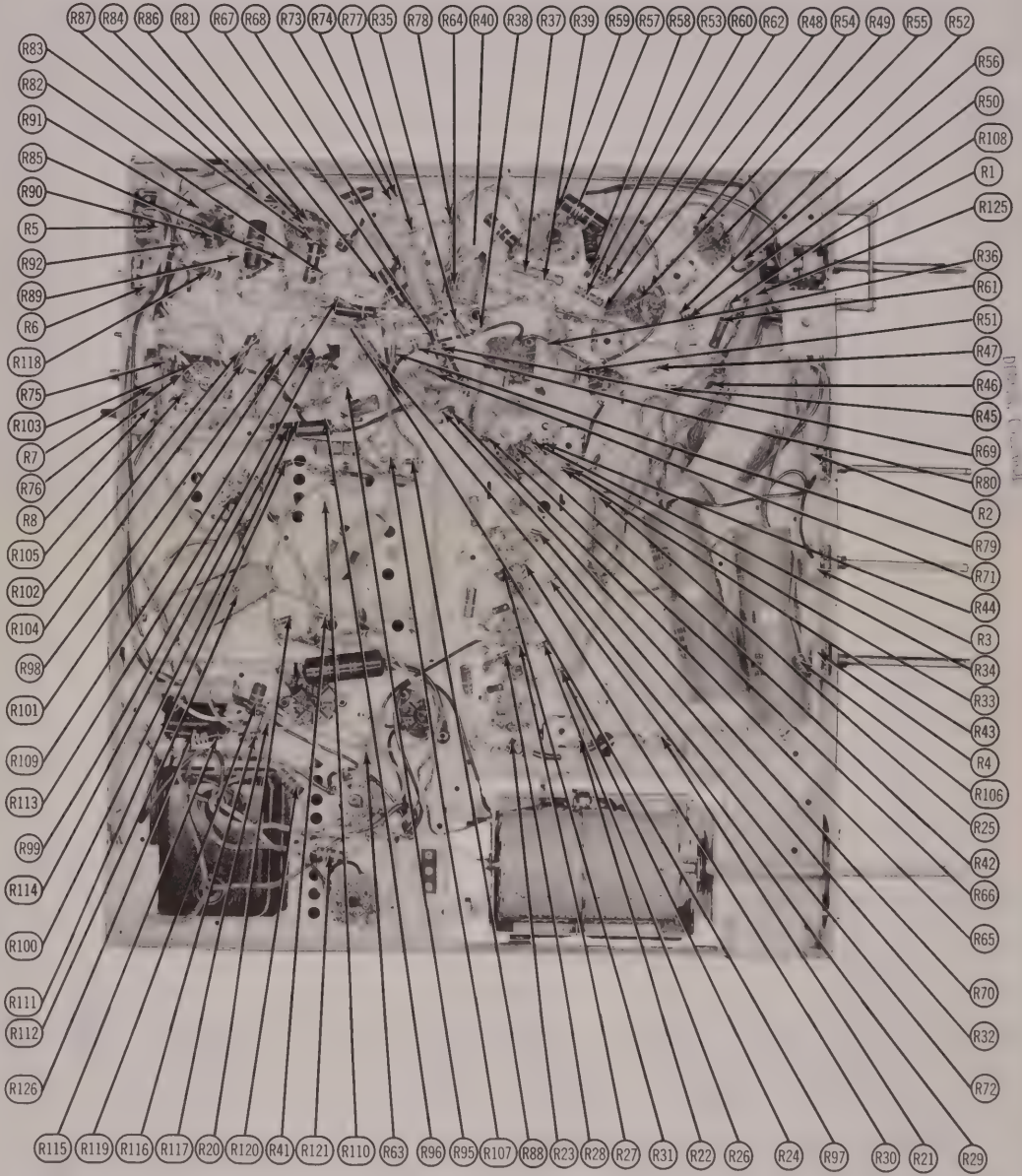
ANTI-PIN CUSHION ADJUSTMENT

Four anti-pin cushion magnets are mounted on the yoke support bracket.

Adjustment of these magnets is best made with a cross-hatch signal generator. Adjust the magnets so that the lines near the edges of the tube appear straight. If a cross hatch signal generator is not available, position the magnets for best overall linearity near the outer edges of the picture tube.

DISASSEMBLY INSTRUCTIONS

1. Remove 4 push-on type control knobs from front of cabinet.
2. Remove 8 metal screws. Remove rear cover.
3. Loosen 2 screws holding antenna bracket, remove bracket.
4. Disconnect H. V. lead, picture tube socket, 2 speaker leads, and 3 plugs from deflection yoke.
5. Remove 4 chassis bolts. Remove chassis.
6. Remove 4 speaker nuts. Remove speaker



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY OF
L. F. BLANKENSHIP
3824 [illegible] ST.
DENVER, COLORADO

LEVEL CONTROL

FISHER
MODEL 70-A

TRADE NAME	Fisher Model 70-A
MANUFACTURER	Fisher Radio Corp., 21-21 44th. Drive, Long Island City, 1, N.Y.
TYPE SET	AC Operated 25 Watt Audio Amplifier
TUBES (Five)	Types 12AT7 AF Amp.-Cathode Follower, 12AU7 Driver, (2) 5881 Output, 5V4G Rectifier
POWER SUPPLY	105-125 Volts AC-50/60 Cycles RATING 1.02 Amp. @ 117 Volts AC

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

FISHER MODEL 70-A

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		FISHER PART No.	STANDARD REPLACEMENT		
V1	AF Amp. - Phase Inverter	12AT7	12AT7	9A	
V2	Driver	12AU7	12AU7	9A	
V3	Output	5881	5881	7S	
V4	Output	5881	5881	7S	
V5	Rectifier	5V4G	5V4G	5L	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	FISHER PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	▲40	480	C-508-114	AFH2-72		B053		FP288	TVL-2830	
B	■40	400								
C2A	▲40	450	C-1798	AFH2-57		B045		FP238	TVL-2764	
B	■40	450								
C3	50	50	C-508-115	PRS50/50		BR505		TC39	TVA-1308	
C4	.22	200	C-68P224V2	P288-22		PJ2P22		PT4022	2TM-P22	
C5	82		C-3310	SI82	TCZ-82	TZ28	NP0K-820			
C6	.022	400	C-68P223M4	P488-022		CUB4S22		PT4122	4TM-S22	
C7	.022	400	C-68P223M4	P488-022		CUB4S22		PT4122	4TM-S22	
C8	.1	400	C-68P104M4	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C9	.1	400	C-68P104M4	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C10	500	1500	C-508-122	HVD-0005						
C11	.01	600	C-68P103M6	689ZX-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	

CONTROLS

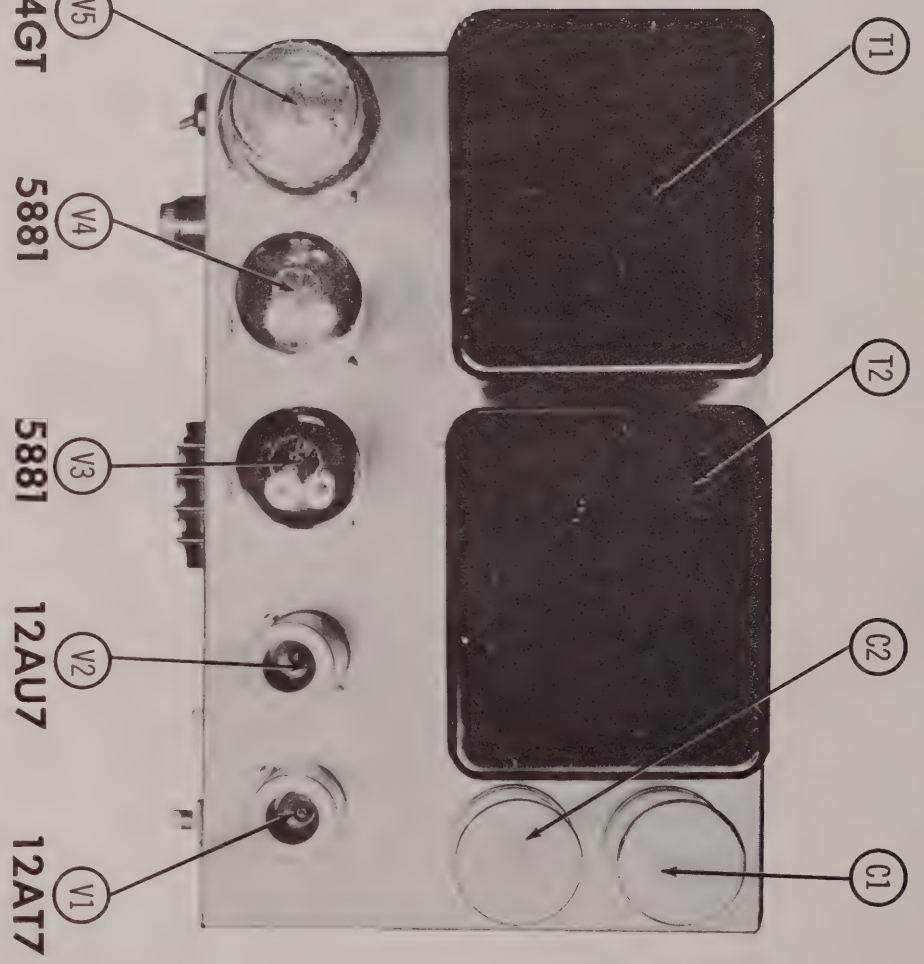
ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	FISHER PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	R-2815-9	Q11-133	A47-500K-S	AB-59	SU-50	Level Adjustment
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R1A
R2A	50KΩ	½	R5000-5	Q11-123	A47-50K-S	AB-31	SU-35	Phase Inverter Balance
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R2A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	FISHER PART No.	IRC PART No.	
R3	1500Ω	½	RC-20BF152K	BTS-150	
R4	220KΩ	½	RC-20BF224K	BTS-220K	
R5	10KΩ	½	RC-20BF103K	BTS-10K	
R6	68KΩ	½	RC-20BF683K	BTS-68K	
R7	100KΩ	½	RC-20BF104K	BTS-100K	
R8	470KΩ	½	RC-20BF474K	BTS-470K	
R9	4700Ω	½	RC-20BF472K	BTS-4700	
R10	150KΩ	½	RC-20BF154K	BTS-150K	
R11	470KΩ	½	RC-20BF474K	BTS-470K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	FISHER PART No.	IRC PART No.	
R12	150KΩ	½	RC-20BF154K	BTS-150K	
R13	27KΩ	½	RC-20BF273K	BTS-27K	
R14	470KΩ	½	RC-20BF474K	BTS-470K	
R15	470KΩ	½	RC-20BF474K	BTS-470K	
R16	350Ω	10	R-508-121	1 3/4A-350	
R17	10KΩ	½	RC-BF103K	BTS-10K	
R18	10KΩ	½	RC-BF103K	BTS-10K	
R19	100Ω	5	R-508-120	1 3/4A-100	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	FISHER PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @1.02A	780VCT .130ADC	5VAC @2A	6.3VAC @2.24A	T-508-117					

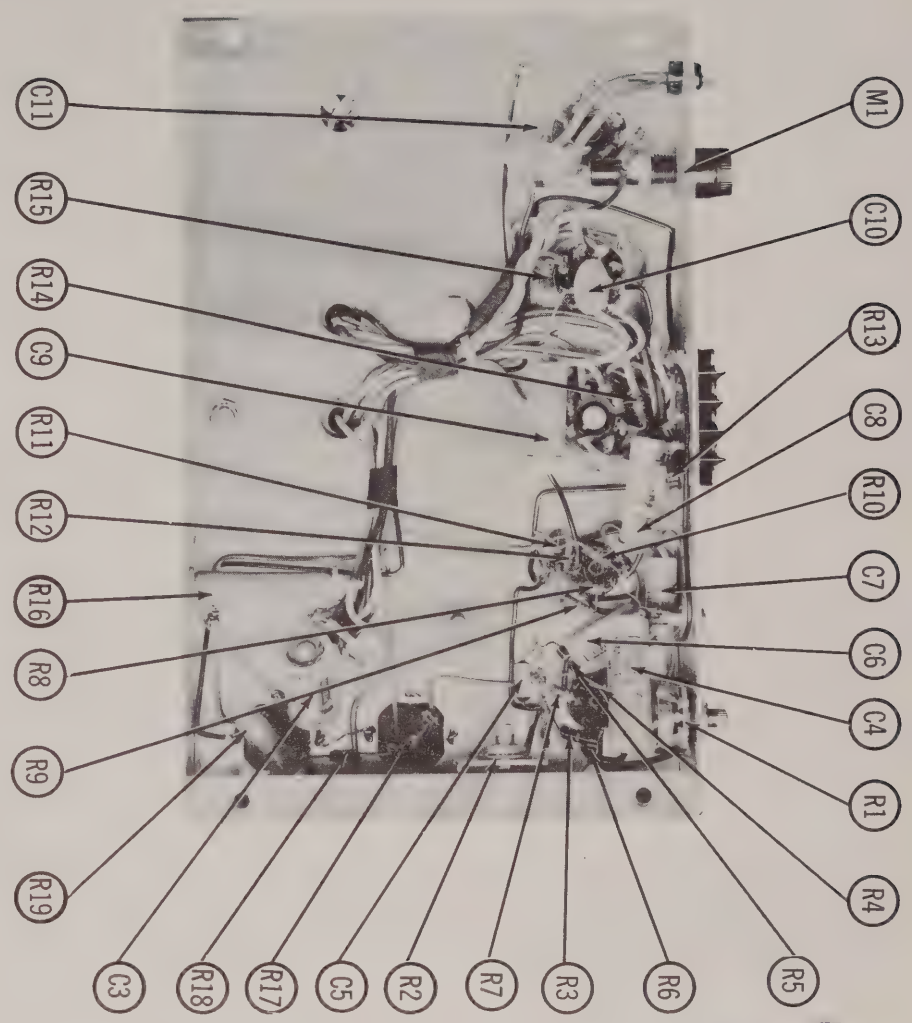
TRANSFORMER (AUDIO OUTPUT)

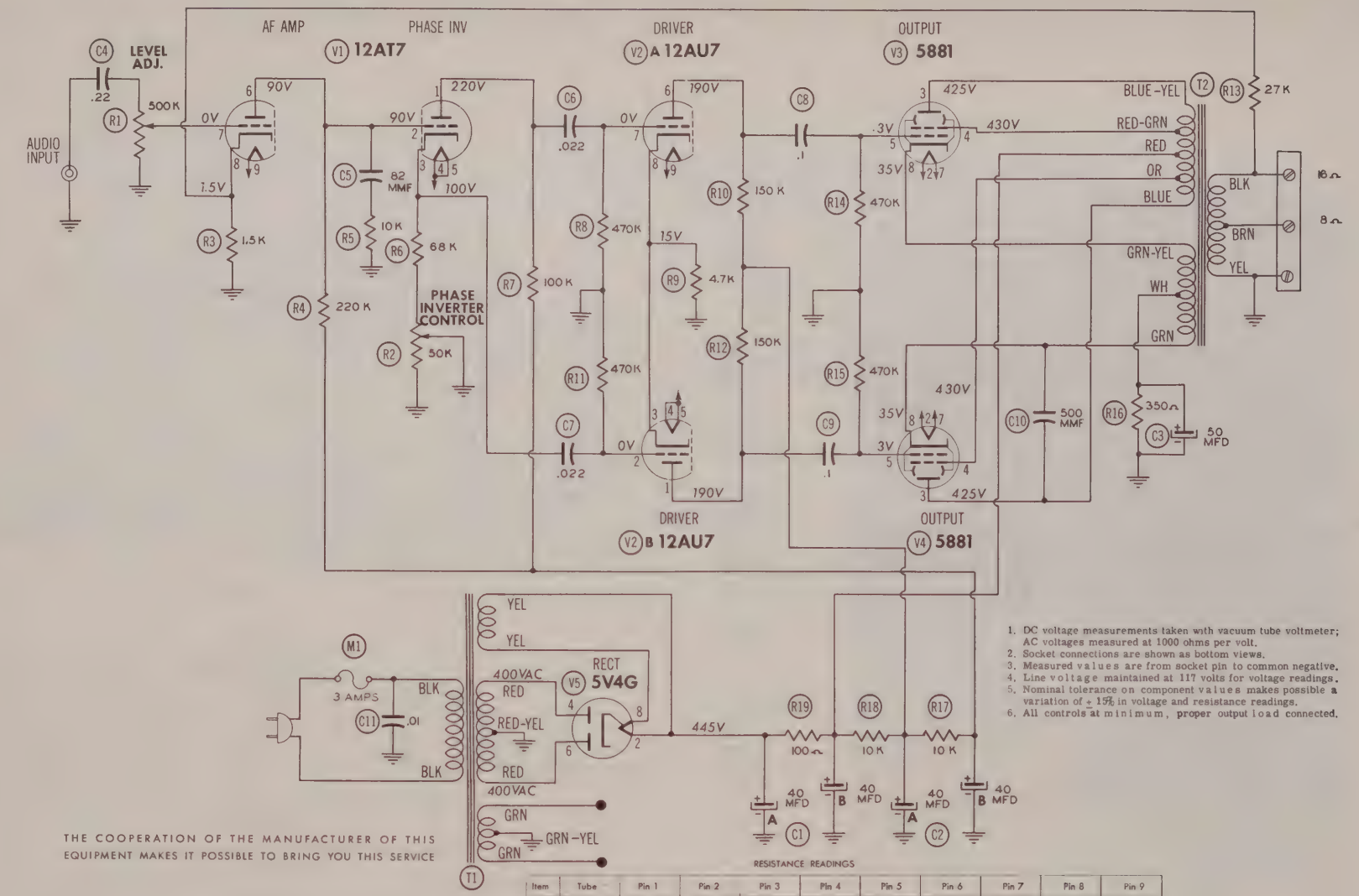
ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI. 1	SEC.	FISHER PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T2	19KΩ CT tap @ 82ΩCT PRI. 2 348Ω CT	16Ω tap @ 8Ω	T-508-116						* DC resistance reading.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			FISHER PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	3A 250V			312003 (3A -3AG)	342001	AGC3	HKP

CHASSIS—BOTTOM VIEW





1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AT7	†120KΩ	†240KΩ	120KΩ	.1Ω	.1Ω	†240KΩ	200KΩ	1.5KΩ	.1Ω
V 2	12AU7	†160KΩ	470KΩ	4.7KΩ	.1Ω	.1Ω	†160KΩ	470KΩ	4.7KΩ	.1Ω
V 3	5881	INF	.1Ω	†210Ω	†150Ω	470KΩ	0Ω	.1Ω	525Ω	
V 4	5881	INF	.1Ω	†210Ω	†150Ω	470KΩ	0Ω	.1Ω	525Ω	
V 5	5V4G	INF	400KΩ	0Ω	92Ω	INF	84Ω	INF	400KΩ	

† MEASURED FROM PIN 8 OF V5

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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263-8

1- DC voltage measurements are at 20,000 ohms per volt, AC voltages measured at 1000 ohms per volt.
2- Socket connections are shown as bottom views.
3- Measured values are from socket pin to common negative.
4- Line voltage maintained at 117 volts for voltage readings.
5- Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6- Volume control at maximum, no signal applied for voltage measurements.

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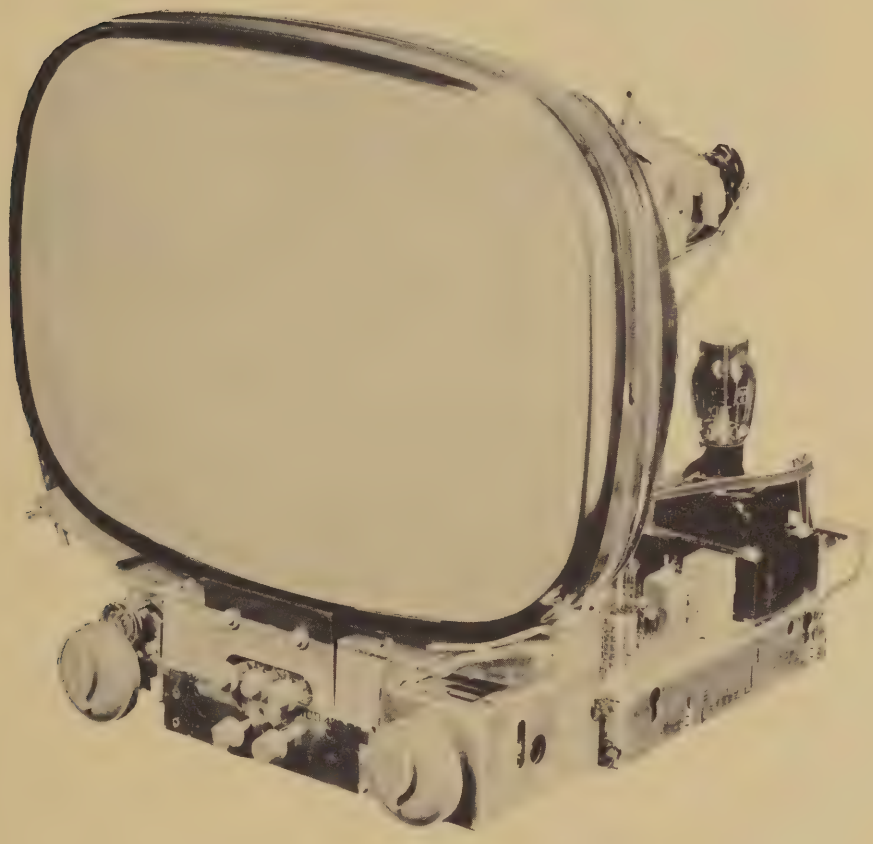

MODEL CMUB422BC

MAGNAVOX MODELS
CMUB422BC, CTB422BC (Ch. 300 Series)

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DATE 1–55 SET 263 FOLDER 9

MAGNAVOX MODELS
CMUB422BC, CTB422BC (Ch. 300 Series)

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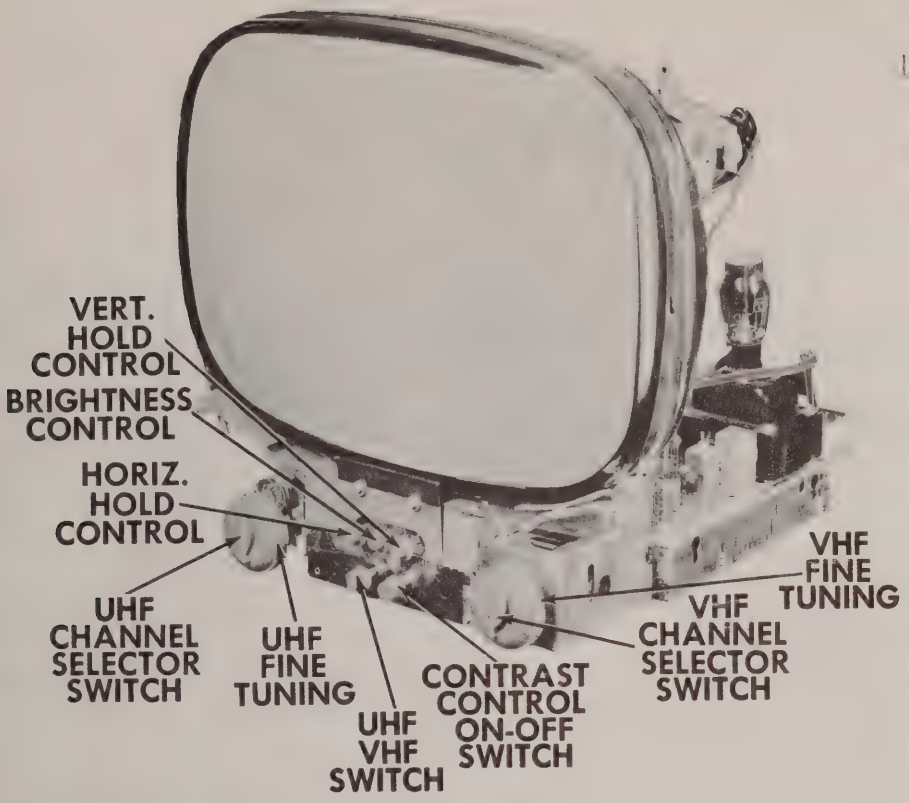

MAGNAVOX MODEL CMUB422BC

TRADE NAME	Magnavox Model CMUB422BC, CTB422BC (Ch. 300 Series)
MANUFACTURER	Magnavox Co., 2131 Bueter Road, Fort Wayne 4, Indiana
TYPE SET	Television Receiver
TUBES	Twenty-three
POWER SUPPLY	110-120 Volts AC - 60 Cycle
RATING	1.68 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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MAGNAVOX MODELS
CMUB422BC, CTB422BC (Ch. 300 Series)

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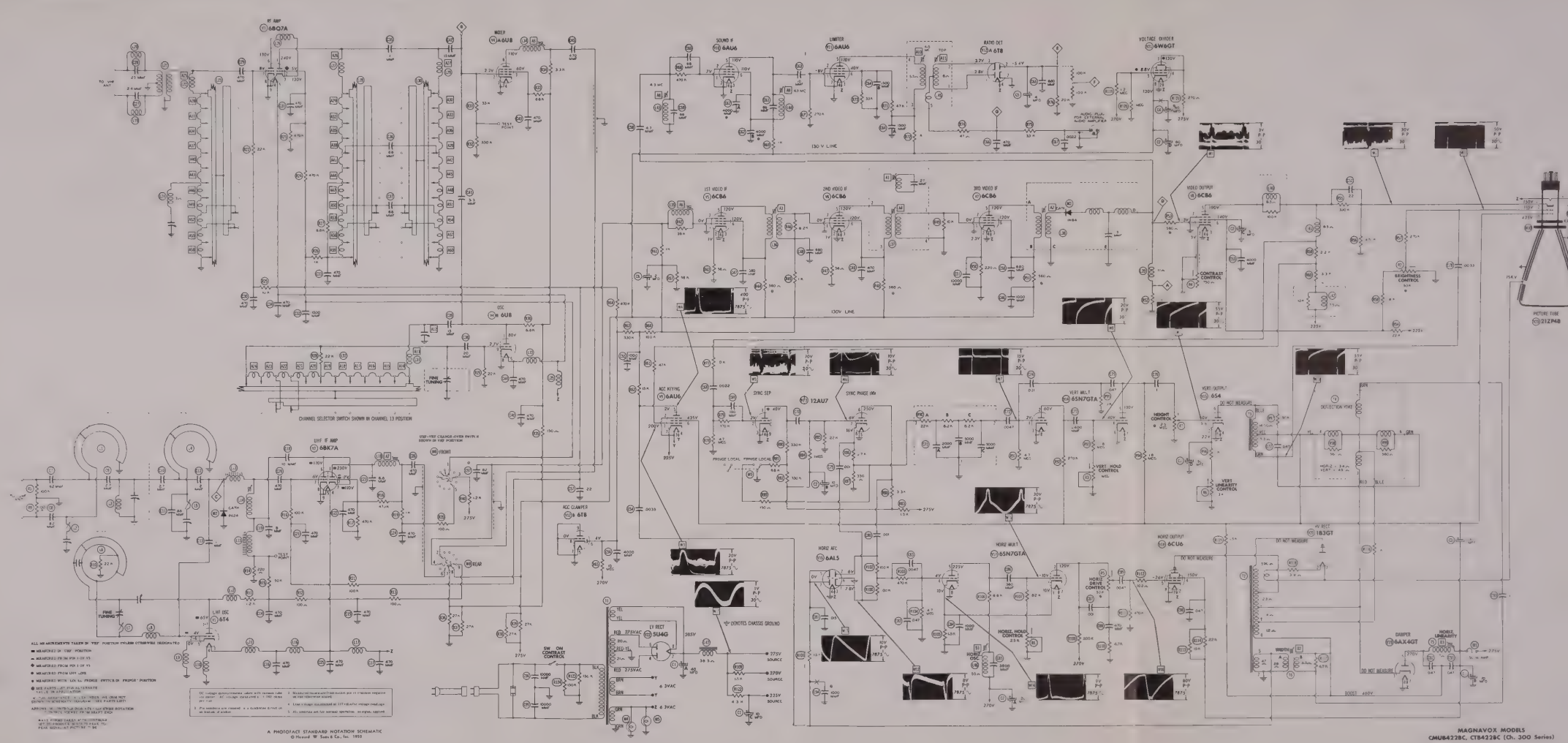
MAGNAVOX MODELS
CMUB422BC, CTB422BC (Ch. 300 Series)
MAGNAVOX MODELS
CMUB422BC, CTB422BC (Ch. 300 Series)
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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DENOTES CHASSIS GROUND
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION
130 V. LINE
DO NOT MEASURE
PICTURE TUBE 21ZP4B

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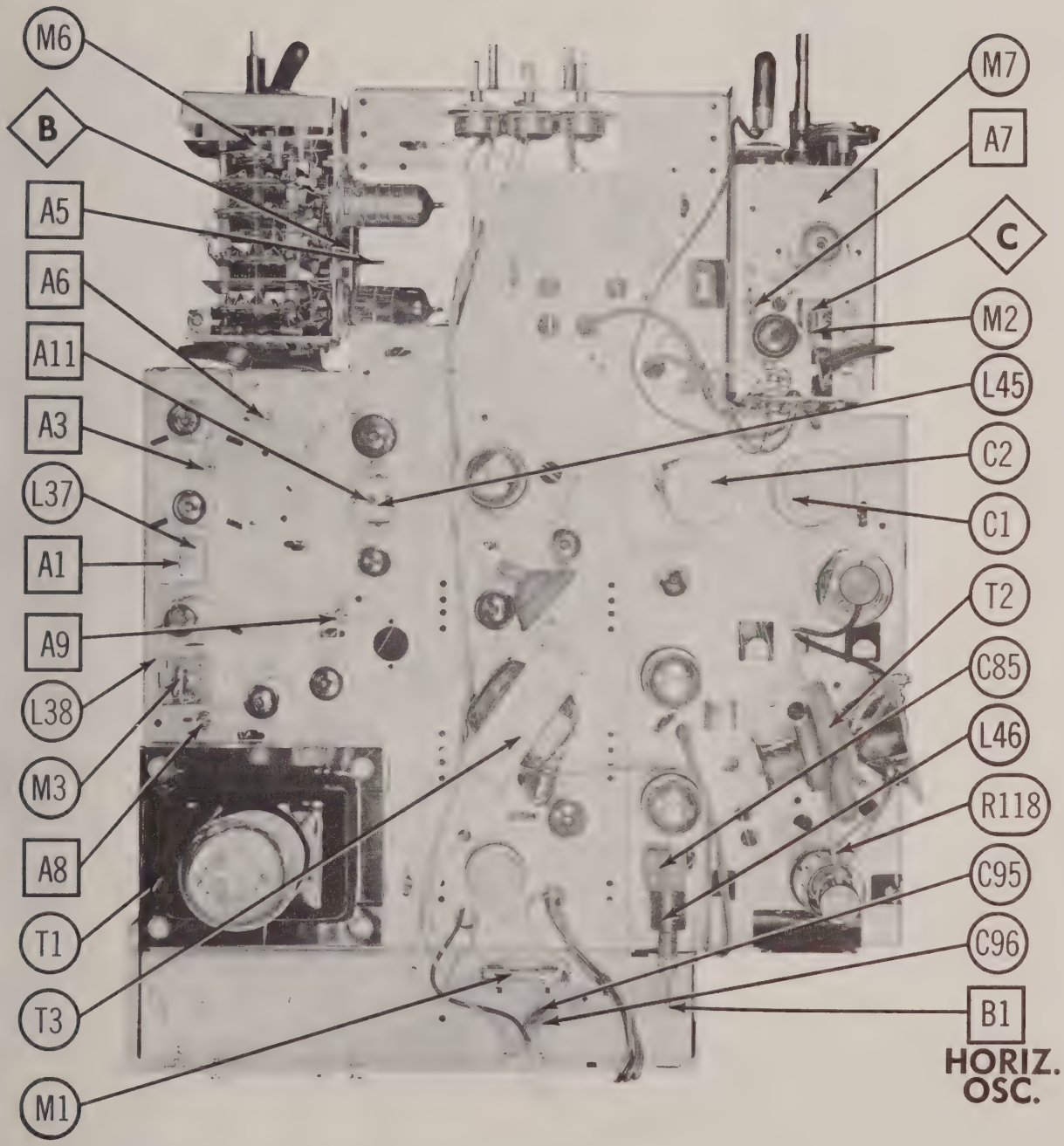

CHASSIS TOP VIEW

SET 263 FOLDER 9

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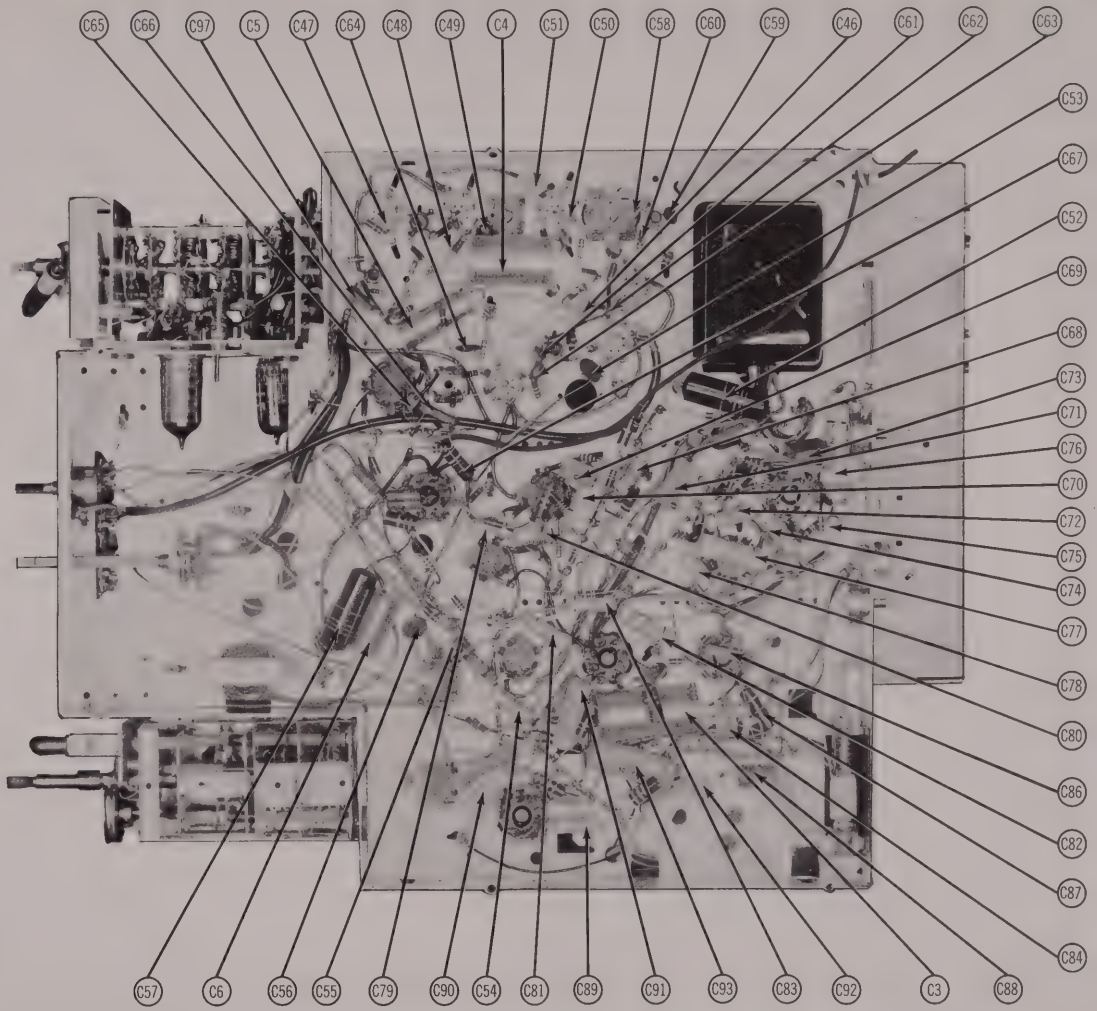

CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

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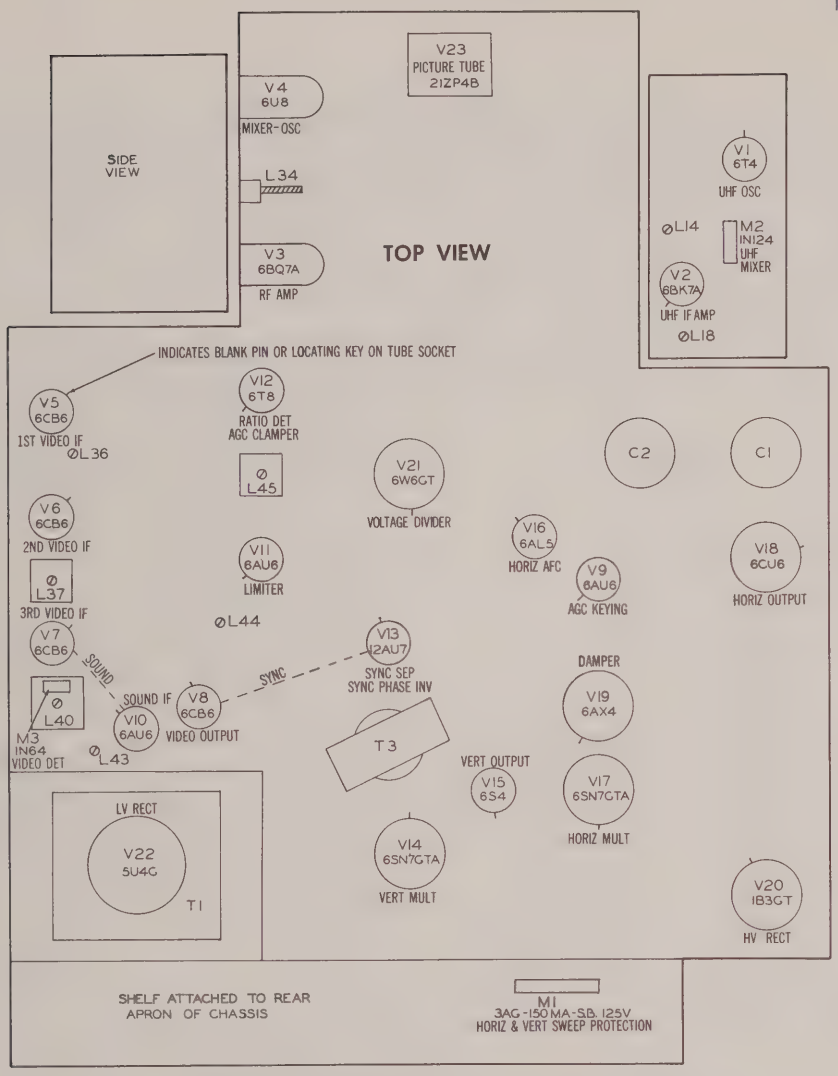
TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V22

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V4, V5, V6, V7, V21 (V1, V2 UHF only)
No pic, no sound, has snow - V3, V4, V5
No pic, has sound, has raster - V8, V9, V23
Has pic, no sound - V10, V11, V12
Overloaded picture - V9, V12

SYNC FAILURE
No vert. sync - V13, V14
No horiz. sync - V13, V16, V17
No vert. or horiz. sync - V13

SWEEP FAILURE
No raster, has sound - V17, V18, V19, V20, V23, Fuse (M1)
No vertical deflection - V14, V15
Poor vert. linearity or foldover - V14, V15
Poor horiz. linearity or foldover - V17, V18, V19
Narrow picture - V17, V18, V19, V20, V22
Vert. off freq. - V13, V14
Horiz. off freq. - V13, V16, V17

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal multivibrator tube (V17) to disable the high voltage.

VIDEO IF ALIGNMENT

Connect the negative lead of a 1.5 volt battery to the ungrounded side of C57. Connect positive side to chassis. Connect the negative lead of a 3 volt battery to the ungrounded side of C6. Connect positive lead to chassis. A single 4.5 volt battery with -1.5 volts and 3 volt taps may be used if necessary. Set the contrast control fully counter clockwise.
In step 1 it is possible to obtain two settings of A1 at which maximum attenuation will occur. Correct adjustment will be indicated when 47.25MC marker is centered in the trap notch and the core is farthest out of the coil.
Connect the synchronised sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001MFD	High side to pin 1 (grid) of 6CB6 (V5). Low side to chassis.	44MC	47.25MC	Any unused high band channel	Vert. Amp. thru 10KΩ to point ④. Low side to chassis.	A1	Couple a second signal generator loosely to point ④ to provide markers. Adjust to center 47.25MC marker in trap notch as in Fig. 1. Use enough sweep output so that trap notch is plainly visible on scope.
2.	"	"	"	42.75MC 45.0MC 45.75MC 47.25MC	"	"	A2, A3, A4	Attenuate sweep generator output for 2 volts peak to peak on scope. Adjust for response similar to Fig. 1. Adjust A2 for maximum gain. A3 positions 42.75MC marker and A4 positions 45.75MC marker. Recheck adjustment of A1.
3.	"	High side to point ①. Low side to chassis.	"	"	"	"	A5, A8	Adjust A5 to place 45.75MC marker at 50% as in Fig. 2. Adjust A8 for maximum amplitude response similar to Fig. 2.
4.	Fig. 3	Thru matching network (Fig.3) to VHF antenna terminals.	213MC (10MC Swp)	"	13	"		Couple marker generator loosely to pin 1 (grid) of V5 (6CB6). Check for response curve similar to Fig. 2 on all VHF channels. Response should be within limits shown (dotted lines). If necessary, repeat steps 1 thru 4.
			207MC (10MC Swp)		12			
			201MC (10MC Swp)		11			
			195MC (10MC Swp)		10			
			189MC (10MC Swp)		9			
			183MC (10MC Swp)		8			
			177MC (10MC Swp)		7			
			85MC (10MC Swp)		6			
			79MC (10MC Swp)		5			
			69MC (10MC Swp)		4			
			63MC (10MC Swp)		3			
			57MC (10MC Swp)		2			
5.	1000Ω Carbon Resistor	High side to point ⑤ thru 1000Ω. Low side to tuner chassis. (Remove UHF tuner shield).	44MC (10MC Swp)	45.75MC	UHF	Vert. Amp. thru 10KΩ to point ④. Low side to chassis.	A7	Turn UHF-VHF switch to "UHF" position. Adjust A7 to place 45.75MC marker at 50% on high frequency slope of response curve.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in series from point ⑥ to chassis. The junction of these two resistors is alignment point ⑦ as shown on the schematic.
Remove V7 (6CB6) from its socket.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
6.	.005MFD	High side to point ①. Low side to chassis.	4.5MC (Unmod)	Any	DC probe thru 100KΩ to point ⑦. Common to chassis.	A9, A9 A10	Attenuate generator output to maintain 6.5 to 7 volts at VTVM. Adjust for maximum deflection.
7.	"	"	"	"	DC probe to point ⑦. Common to point ⑥.	All	Temporarily short pin 1 (grid) of V11 (6AU8) to chassis. Adjust VTVM for zero then remove short from pin 1 of V11. Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. If All required more than 2 turns repeat steps 6 and 7. Replace V7 in its socket.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.
Remove V7 (6CB6) from its socket.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	.005MFD	High side to point ①. Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. thru 10KΩ to point ⑦. Low side to chassis.	A8, A9, A10	Disconnect stabilizing capacitor C5. Adjust for curve of maximum amplitude and symmetry similar to Fig. 4.
7.	"	"	"	"	"	Vert. Amp. thru 10KΩ to point ⑦. Low side to chassis.	All	Reconnect stabilizing capacitor C5. Adjust so that 4.5MC occurs at center of cross-over lines as in Fig. 5. SLIGHTLY re-touch A10 for maximum amplitude and straightness of crossover lines. Replace V7 in its socket.

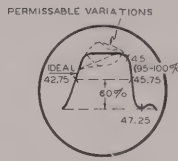


FIG. 1

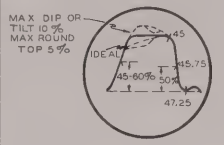


FIG. 2

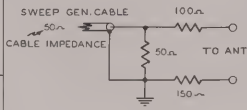


FIG. 3

FIG. 4

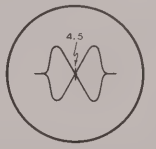


FIG. 5

FIG. 6

VHF OSCILLATOR ALIGNMENT

Complete oscillator alignment may not be necessary. If all channels are off the same amount and direction, it may be possible to correct them in one step using A12. If some channels tune at one end of the fine tuning control and others tune near the opposite end, it will be necessary to make individual oscillator adjustment. Loosely couple an RF signal generator to the grid of the first video IF amplifier (V5) and tune it accurately to 45.75MC.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Fig.3	Thru matching network (Fig.3) to VHF antenna terminals.	213MC (10MC Swp)	211.25MC 45.75MC	13	Vert. Amp. thru 10KΩ to point ①. Low side to chassis.	A12	Adjust (compress or expand coil) so that video RF and video IF markers coincide on response curve.
9.	"	"	207MC (10MC Swp)	205.25MC 45.75MC	12	"	A24	Adjust position of loops so that video RF and video IF markers coincide on response curve.
			201MC (10MC Swp)	199.25MC 45.75MC	11		A25	
			195MC (10MC Swp)	193.25MC 45.75MC	10		A26	
			189MC (10MC Swp)	187.25MC 45.75MC	9		A27	
			183MC (10MC Swp)	181.25MC 45.75MC	8		A28	
			177MC (10MC Swp)	175.25MC 45.75MC	7		A29	
10.	"	"	85MC (10MC Swp)	83.25MC 45.75MC	6	"	A30	Adjust (compress or expand coils) so that video RF and video IF markers coincide on response curve.
			79MC (10MC Swp)	77.25MC 45.75MC	5		A31	
			69MC (10MC Swp)	67.25MC 45.75MC	4		A32	
			63MC (10MC Swp)	61.25MC 45.75MC	3		A33	
			57MC (10MC Swp)	55.25MC 45.75MC	2		A34	
11.	Recheck channels 7 thru 13 (steps 8 and 9).							

VHF ANTENNA, RF AND CONVERTER ALIGNMENT

The RF tuner has been properly aligned at the factory and is very stable. Alignment of this portion should not be required unless tubes are replaced in the tuner. Careful selection of the replacement tubes should eliminate the necessity of tuner re-alignment.
The antenna coils are mounted on the rear wafer, RF coils on the second wafer from rear, and the converter coils on the third wafer from rear.
The RF wafer has B+ on it and should not be touched with the hand or metal tool.
The oscillator coils (front wafer) have been aligned under "Oscillator Alignment" and should not be touched.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	Fig. 3	Thru matching network (Fig.3) to VHF antenna terminals.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10KΩ to point ①. Low side to chassis.	A35, A36 A37	Adjust in order given (compress or expand coil) to obtain response similar to Fig.6.
13.	"	"	207MC (10MC Swp)	205.25MC 209.75MC	12	"	A38, A39 A30	Adjust position of loops in order given to obtain response similar to Fig.6.
			201MC (10MC Swp)	199.25MC 203.75MC	11		A31, A32 A33	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A34, A35 A36	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A37, A38 A39	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A40, A41 A42	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A43, A44 A45	
14.	"	"	85MC (10MC Swp)	83.25MC 87.75MC	6	"	A46, A47 A48	Compress or expand coils for response similar to Fig. 6.
			79MC (10MC Swp)	77.25MC 81.75MC	5		A49, A50 A51	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A52, A53 A54	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A55, A56 A57	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A58, A59 A60	

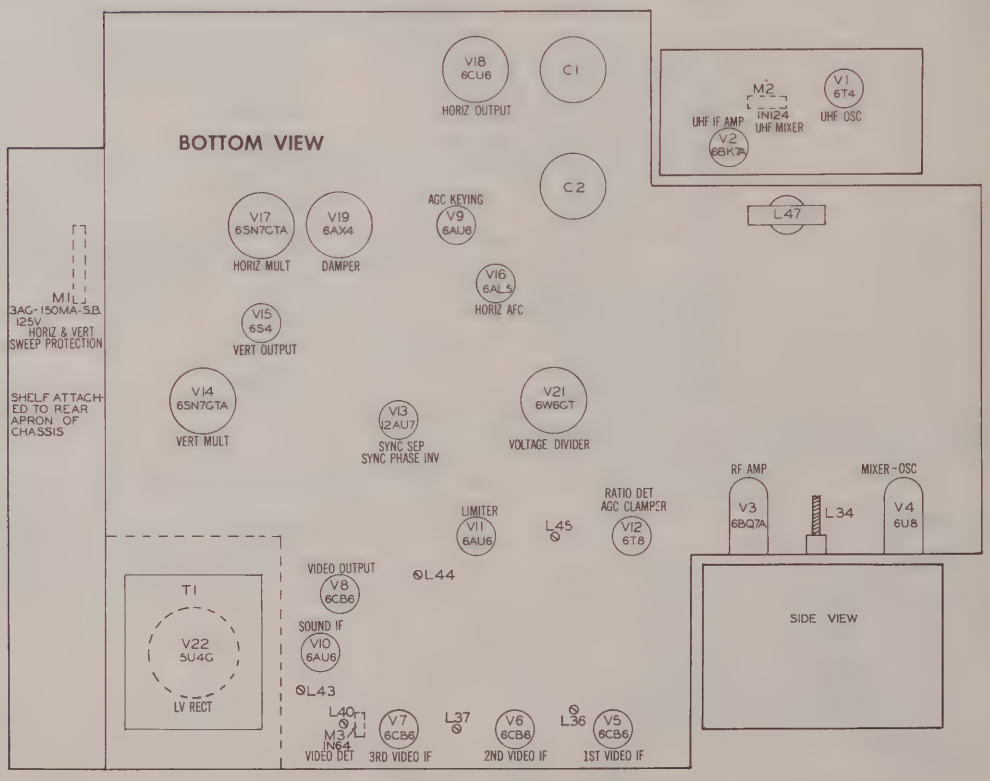
UHF TUNER ALIGNMENT

Alignment of this portion of the receiver is not recommended in the field.

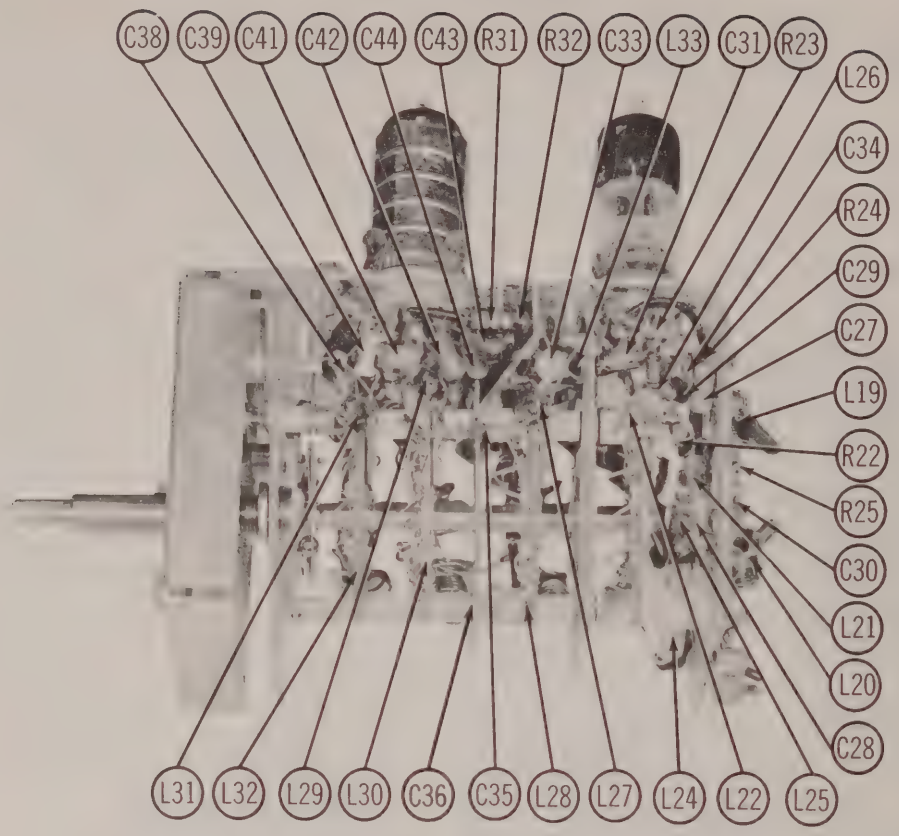
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6T4	♦■1.4KΩ	22KΩ	.1Ω	0Ω	0Ω	22KΩ	♦■1.4KΩ		
V 2	6BK7A	♦†3.3KΩ	♦†300KΩ	INF	.1Ω	0Ω	INF	1.3Meg	0Ω	0Ω
V 3	6BQ7A	†2.2KΩ	†300KΩ	INF	0Ω	.1Ω	INF	1.1Meg	0Ω	0Ω
V 4	6U8	■7KΩ	360KΩ	■68KΩ	0Ω	.1Ω	■3.5KΩ	0Ω	0Ω	22KΩ
V 5	6CB6	57KΩ	56Ω	.1Ω	0Ω	■560Ω	■560Ω	0Ω		
V 6	6CB6	57KΩ	56Ω	.1Ω	0Ω	■560Ω	■560Ω	0Ω		
V 7	6CB6	.1Ω	220Ω	.1Ω	0Ω	■560Ω	■560Ω	0Ω		
V 8	6CB6	6KΩ	140Ω	.1Ω	0Ω	†10KΩ	†26KΩ	0Ω		
V 9	6AU6	†55KΩ	†4.3KΩ	†4.3KΩ	†4.3KΩ	180KΩ	▲1.5KΩ	†4.3KΩ		
V 10	6AU6	470KΩ	0Ω	.1Ω	0Ω	■1KΩ	■1KΩ	0Ω		
V 11	6AU6	270KΩ	0Ω	.1Ω	0Ω	■1KΩ	■47KΩ	0Ω		
V 12	6T8	INF	20KΩ	INF	.1Ω	0Ω	500KΩ	0Ω	0Ω	0Ω
V 13	12AU7	†▲400KΩ	5.2Meg	0Ω	0Ω	0Ω	†5KΩ	22KΩ	3KΩ	.1Ω
V 14	6SN7GTA	4.7Meg	▲270KΩ	0Ω	2.4Meg	▲1.8Meg	0Ω	.1Ω	0Ω	
V 15	6S4	INF	1.8KΩ	2Meg	.1Ω	0Ω	2Meg	INF	INF	▲3KΩ
V 16	6AL5	5.3Meg	5.3Meg	.1Ω	0Ω	15KΩ	0Ω	15KΩ		
V 17	6SN7GTA	100KΩ	†200KΩ	1.5KΩ	4.7Meg	†8.4KΩ	1.5KΩ	.1Ω	0Ω	
V 18	6CU6	INF	.1Ω	INF	†9KΩ	470KΩ	470KΩ	0Ω	0Ω	TOP CAP ▲23Ω
V 19	6AX4GT	▲18Ω	0Ω	2Meg	▲1.5KΩ	†55Ω	15KΩ	.1Ω	0Ω	
V 20	1B3GT		PINS	1 - 8	HAVE	INF	RESISTANCE			TOP CAP ▲615Ω
V 21	6W6GT	330Ω	0Ω	†300Ω	†300Ω	600KΩ	INF	.1Ω	30KΩ	
V 22	5U4G	INF	30KΩ	INF	21Ω	INF	18Ω	INF	30KΩ	
V 23	21ZP4B	.1Ω	†300KΩ	PIN 10 ▲1.5KΩ	PIN 11 †200KΩ	PIN 12 0Ω				

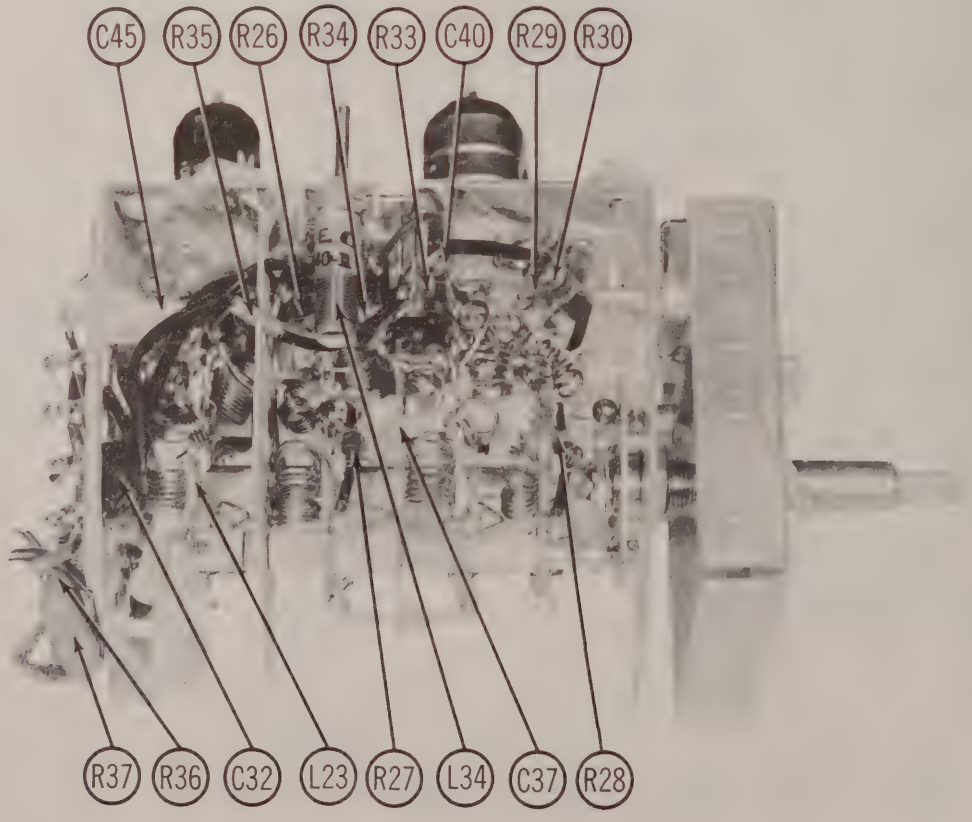
♦ MEASURED IN UHF POSITION
■ MEASURED FROM 130V LINE
† MEASURED FROM PIN 2 OF V22.
▲ MEASURED FROM PIN 3 OF V19
▲ MEASURED WITH "LOCAL-FRINGE" SWITCH IN "LOCAL" POSITION
ALL MEASUREMENTS TAKEN "VHF" POSITION UNLESS OTHERWISE DESIGNATED.



TUBE PLACEMENT CHART



VHF TUNER-RIGHT SIDE



VHF TUNER-LEFT SIDE

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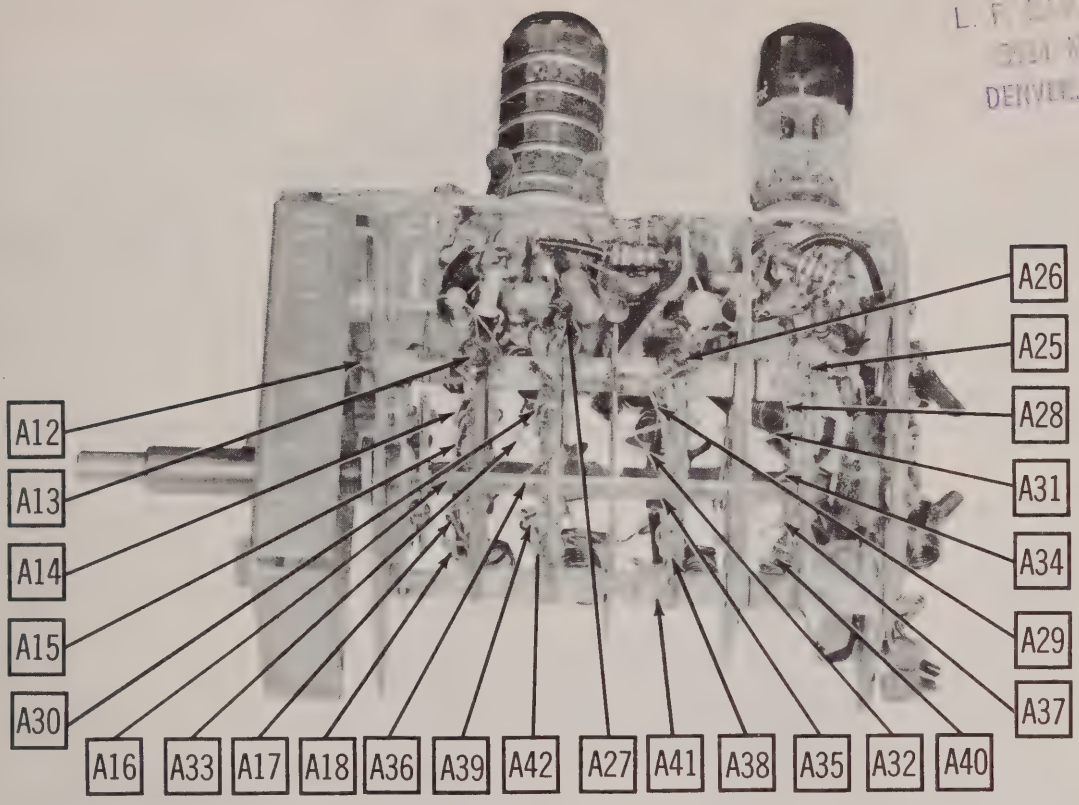
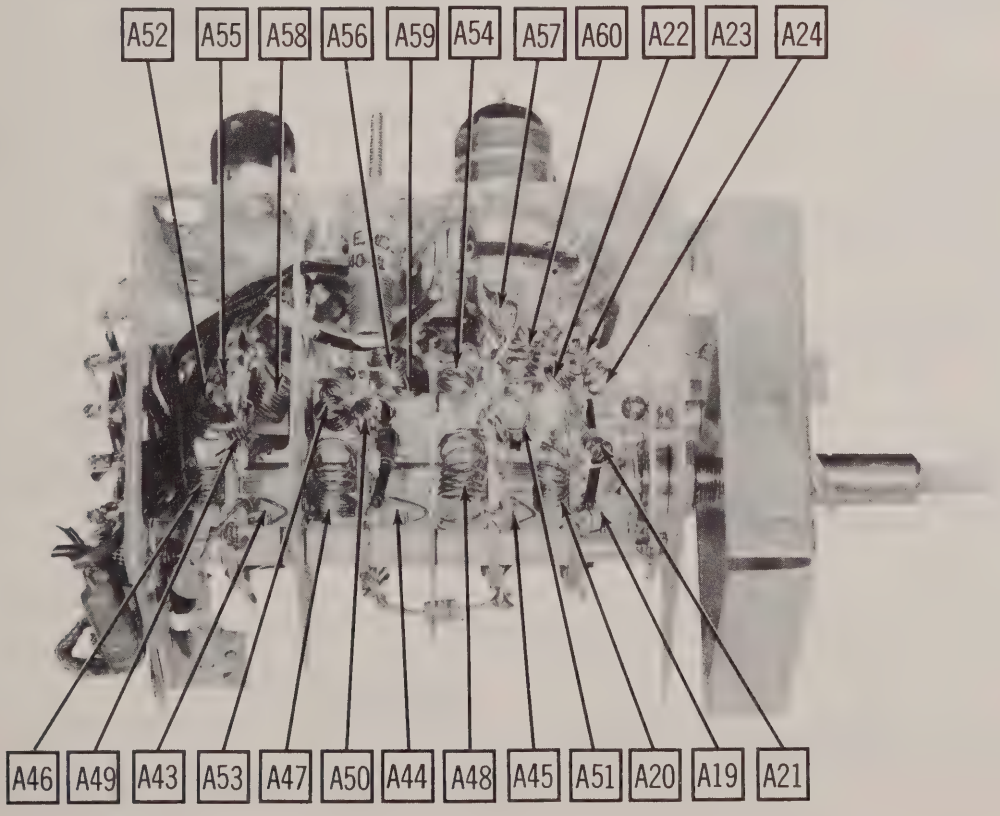
L. F. SAMPSON SHIP
2024 MEADE ST.
DENVER, COLORADO



VHF TUNER-RIGHT SIDE ALIGNMENT IDENTIFICATION



VHF TUNER-LEFT SIDE ALIGNMENT IDENTIFICATION

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V18, V19 and V22. Check T2, T4A, R113, R114, C89, C1B, C87 and other associated components. Check adjustments R5, B2 and B3.

DRIVE LINES

Check by substitution V18 and V19. Check adjustments R5 and B3. Check R113, R114, C89, C87 and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V18 and V19. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V17, V18 and V19. Check C82 for open. Check L46, R105, R1, C2A and other associated components.

XMAS TREE EFFECT

Check by substitution V17, V18 and V19. Check T2 and T4A for internal arcing. Check L46, C85, C86, R106, R108, R105 and other associated components.

VERTICAL

LOSS OF SWEEP

Check by substitution V14 and V15. Check waveform W9.

If Satisfactory	If Unsatisfactory
Check T3, T4B, C77, C1D, R97, R96 and other associated components.	Check C73, C76, C75, R94, R115, R92 and other associated components.

INSUFFICIENT SWEEP

Check by substitution V14 and V15. Check height and vertical linearity controls for proper operation. Check T3 and T4B.

COMPRESSED AT BOTTOM

Check by substitution V14 and V15. Check R94, R115, R7, C75, C3 and other associated components.

COMPRESSED AT TOP

Check by substitution V14 and V15. Check C1D, R96, R6, T3, T4B and other associated components.

FOLDS

Check by substitution V14 and V15. Check C75, C76, R95, R96 and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Substitute V13. Check C68, C70, C69, R77, R83, R82, R80, R88 and other associated components.

LOSS OF VERTICAL SYNC - HORIZONTAL SYNC SATISFACTORY

Substitute V14. Check vertical integrator network. Check R92, R93, R3, C73, C72 and other associated components.

LOSS OF HORIZONTAL SYNC - VERTICAL SYNC SATISFACTORY

Check by substitution V16 and V17. Check horizontal AFC network. Check C83, C82, C85, R105, L46 and other associated components.

HORIZONTAL BENDING

Check by substitution V13, V16 and V17. Check horizontal AFC network.

VIDEO

LOSS OF VIDEO

Substitute V8. Check R59, R55, R54, L41, L40, C53, C52, C2C and other associated components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check video IF alignment.

POOR CONTRAST

Substitute V8. Check contrast control. Check video detector crystal network. Check L40, C52, R55 and other associated components.

NEGATIVE PICTURE

Substitute V8. Check picture tube, video detector crystal network. Check C52, R55, L40, L39 and other associated components.

SMEAR

Substitute V8. Check L39, L40, C52, R55, R52 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V3, V5, V6, V7 and V8 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V10, V11 and V12.
Check L44, R69, R72, R71, C60, C63, C62 and C64. Check audio IF alignment. If still unsatisfactory, check external audio.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustment A11. If still unsatisfactory, check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly. Check switch on contrast control and T1. If filaments light, substitute V22. Check B+ filter and decoupling network for component failure or change of value.

SMALL AND/OR DIM PICTURE

Substitute V22. Check B+ filter and decoupling network.

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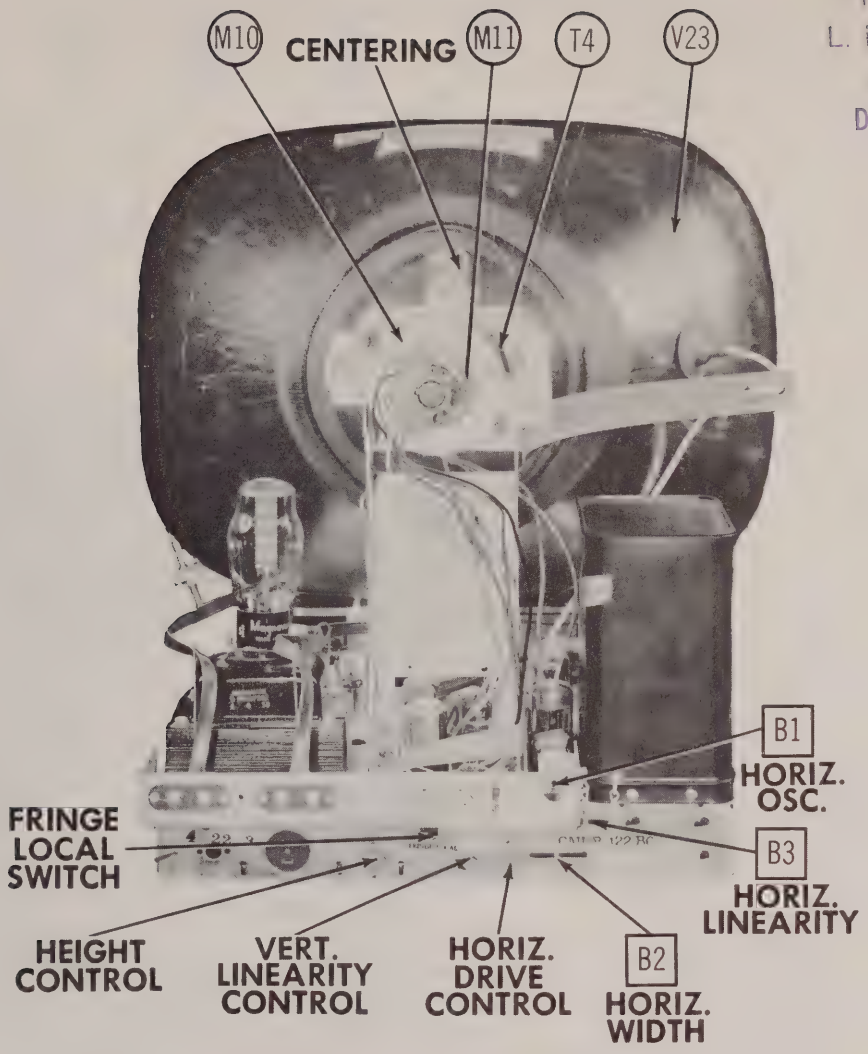
DENVER, COLORADO



CHASSIS—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Set the horizontal hold control to its mid-range position.

Turn the horizontal oscillator slug (B1) slowly clockwise while switching on and off channel until picture just loses sync. Turn B1 counter clockwise until picture just pulls into sync then turn B1 an additional half turn counter clockwise.

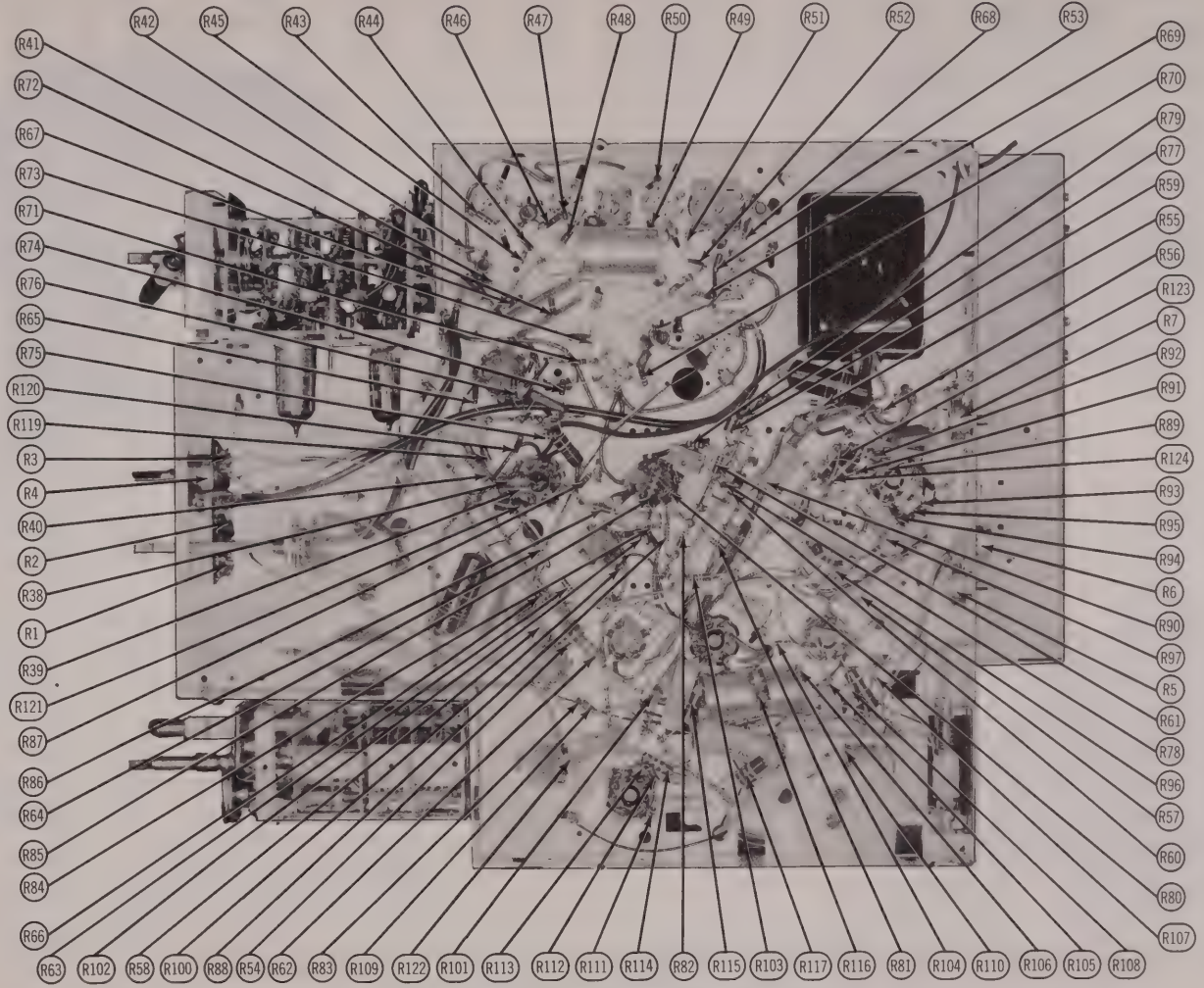
The picture should hold sync (or have an equal number of diagonal bars) at both extremes of the horizontal hold control.

If necessary, readjust B1 slightly and test for sync or pull-in as outlined above.

Adjust the horizontal drive control in a clockwise direction as far as possible without the presence of vertical white lines or compression near the center of the picture.

Adjust the width slug (B2) for a picture slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity slug (B3) for a picture that is symmetrical from left to right.



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY OF
L. F. BLANKENSHIP
[illegible] ST.
[illegible] COLORADO

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		MAGNAVOX PART No.	STANDARD REPLACEMENT		
V1	UHF Osc.	6T4	6T4	7DX	
V2	UHF IF Amp.	6BK7A	6BK7A	9AJ	6BK7 used in some versions.
V3	RF Amp.	6BQ7A	6BQ7A	9AJ	6BZ7 used in some versions.
V4	Mixer-Osc.	6U8	6U8	9AE	
V5	1st Video IF Amp.	6CB6	6CB6	7CM	
V6	2nd Video IF Amp.	6CB6	6CB6	7CM	
V7	3rd Video IF Amp.	6CB6	6CB6	7CM	
V8	Video Output	6CB6	6CB6	7CM	
V9	AGC Keying	6AU6	6AU6	7BK	
V10	Sound IF Amp.	6AU6	6AU6	7BK	
V11	Limiter	6AU6	6AU6	7BK	
V12	Ratio Det-AGC Clamper	6T8	6T8	9E	
V13	Sync Sep-Sync Phase Inverter	12AU7	12AU7	9A	
V14	Vert. Mult.	6SN7GTA	6SN7GTA	8BD	
V15	Vert. Output	6S4	6S4	9AC	
V16	Horiz. AFC	6AL5	6AL5	6BT	
V17	Horiz. Mult.	6SN7GTA	6SN7GTA	8BD	
V18	Horiz. Output	6CU6	6CU6	6AM	
V19	Damper	6AX4GT	6AX4GT	4CG	
V20	HV Rectifier	1B3GT	1B3GT	3C	
V21	Voltage Divider	6W6GT	6W6GT	7S	
V22	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA					RETMA BASE TYPE	NOTES
	MAGNAVOX PART No.	CBS-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.		
V23	21ZP4B	21ZP4B 21ZP4A	21ZP4B 21ZP4A	21ZP4B 21ZP4A 21ZP4 ①	21ZP4B 21ZP4A	12N 12N 12D	① Circuit changes necessary.

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MAGNAVOX PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	■40	350	270021-52	AFH3-46		C037		FP378	TVL-3792	
B	▬70	350		PRS50/50		BR505		TC39	TVA-1308	
C	▲10	350								
D	50	50								
C2A	▬20	350	270021-51	AFH4-49				FP454.2	TVL-4620	
B	■10	350		PRS250/30-30					TVA-1613	
C	▲5	350								
D	60	200								
C3	10	350	270027-23	PRS350/10		BR1045		TC62	TVA-1604	
C4	40	200		PRS250/40		BR4025		TC58	TVA-1511	Note 1
C5	4	50	270027-10	PRS150/4		BR550		TC30	TVA-1303	
C6	2	50	270027-22	E26E6		BBR2-50T		TC302	TVA-1301	
C7	.82		250221-113							
C8	.82		250221-113							
C9	2.7		250221-119							
C10	2.7		250221-119							
C11	.68		250221-112		TCZ-.68	TZ02	NP0A-0R68			
C12	1.2		250221-115							
C13	.1		250221-101							
C14	470		250175-8	BPD-00047	DD-471	K060	801-00047	UC-5347	5GA-T47	
C15	470		250175-8	BPD-00047	DD-471	K060	801-00047	UC-5347	5GA-T47	
C16	470		250175-8	BPD-00047	DD-471	K060	801-00047	UC-5347	5GA-T47	
C17	470		250175-8	BPD-00047	DD-471	K060	801-00047	UC-5347	5GA-T47	
C18	10		250207-3	SI10	D6-100	TP09	GP1K-100	UC-541	5GA-Q1	
C19	8		250175-11	SI8	D6-080	TP08	GP1K-080		5GA-V8	
C20	470		250175-8	BPD-00047	DD-471	K060	801-00047	UC-5347	5GA-T47	
C21	470		250175-8	BPD-00047	DD-471	K060	801-00047	UC-5347	5GA-T47	
C22	470		250175-8	BPD-00047	DD-471	K060	801-00047	UC-5347	5GA-T47	
C23	6.8		250221-125	SI6.8	TCZ-6.8	TP07	NP0K-6R8	ZT-5568	5TCCB-V68	
C24	470		250175-8	BPD-00047	DD-471	K060	801-00047	UC-5347	5GA-T47	
C25	470		250175-8	BPD-00047	DD-471	K060	801-00047	UC-5347	5GA-T47	
C26	470		250175-8	BPD-00047	DD-471	K060	801-00047	UC-5347	5GA-T47	
C27	24		250207-83	SI24	D6-240	TZ15	GP1K-240			
C28	25		250207-83	SI25	D6-250	TP25	GP1K-250	ZT-5425	5GA-Q25	
C29	470		250207-50	BPD-00047	DD-471	K060	801-00047	UC-5347	5GA-T47	
C30	470		250207-50	BPD-00047	DD-471	K060	801-00047	UC-5347	5GA-T47	
C31	470		250207-50	BPD-00047	DD-471	K060	801-00047	UC-5347	5GA-T47	
C32	1500		250175-3	BPD-0015	DD-152	K071	801-0015	DC-5215	5GA-D15	
C33	470		250207-50	BPD-00047	DD-471	K060	801-00047	UC-5347	5GA-T47	
C34	470		250207-50	BPD-00047	DD-471	K060	801-00047	UC-5347	5GA-T47	
C35	.1		250216-2							
C36	.68		250209-112		TCZ-.68	TZ02	NP0A-OR68			
C37	.68		250209-112		TCZ-.68	TZ02	NP0A-OR68			
C38	20		250088-113							
C39	15		250088-112	SI15	D6-150	TP11	GP1K-150	UC-5415	5GA-Q15	
C40	470		250207-50	BPD-00047	DD-471	K060	801-00047	UC-5347	5GA-T47	
C41	3.3		250209-121	SI3.3NP0	TCZ-3.3	TZ06	NP0A-3R3	ZT-5533	5TCCB-V33	
C42	15		250207-5							
C43	470		250207-50	BPD-00047	DD-471	K060	801-00047	UC-5347	5GA-T47	
C44	470		250207-50	BPD-00047	DD-471	K060	801-00047	UC-5347	5GA-T47	
C45	470		250207-50	BPD-00047	DD-471	K060	801-00047	UC-5347	5GA-T47	
C46	1000		250175-14	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C47	680		250218-4	BPD-00068	DD-681	K065	801-00068	UC-5368	5GA-T68	
C48	680		250218-4	BPD-00068	DD-681	K065	801-00068	UC-5368	5GA-T68	
C49	470		250218-6	BPD-00047	DD-471	K069	801-00047	UC-5347	5GA-T47	
C50	680		250218-4	BPD-00068	DD-681	K065	801-00068	UC-5368	5GA-T68	
C51	10000		250175-2	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C52	.22	200	250202-15	P288-22		PJ2P22		PT4022	2TM-P22	
C53	4000		250175-1	BPD-004	DD-402	K078	801-004	DC-524	5HK-D4	
C54	.0033	600	250201-4	P688-0033	D6-332	CUB6D33	GP2-333-332	PT6233	6TM-D33	

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L. F. BLANKENSHIP
3324 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No	RATING CAP	RATING VOLT	MAGNOVOX PART No	AEROVOX PART No	CENTRALAB PART No	CORNELL-DUBILIER PART No	ERIE PART No	MALLORY PART No	SPRAGUE PART No	NOTES
C55	4000		250175-16	BPD-01	DD-103	K062	801-001	DC-511	5HK-DI	
C56	4000		250175-1	BPD-004	DD-402	K078	801-004	DC-534	5HK-D4	
C57	.22	200	250205-15	P288-22		PJP222		PT4022	2TM-P22	
C58	4.7		250231-123	514 RN#0	TC2-4.7	TC2T	NP0K-4R7	ZT-5547	5TC-D-V47	
C59	68		250218-7	B198	D6-680	TP3S	GPJK-680	UC-5468	5GA-Q68	
C60	68		250218-7	B198	D6-680	TP3S	GPJK-680	UC-5468	5GA-Q68	
C61	68		250218-7	B198	D6-680	TP3S	GPJK-680	UC-5468	5GA-Q68	
C62A	4000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	Note 3
B	4000			BPD-008	DD-502	K080	801-005	DC-525	5HK-D5	Note 3
C63	10		250207-3	D10	TY2	TY2	GPJK 100	UC-551	5GA-Q1	
C64A	1500			BPD-2X0015	DD8-152	DK07I	812-0015	DCD-5215	5HK-2D15	
B	1500									
C65	680		250218-6	BPD-00068	DD-681	K065	801-00068	UC-5288	5GA-T68	
C66	470		250088-117	S1470	D6-471	TP4S	GP2L 471	UC-5547	5GA-T47	
C67	.0022	400	250212-3	P488-0022	D6-222	CUB4D22	GP2-333-222	PT4222	4TM-D22	
C68	.0022	400	250212-3	P488-0022	D6-222	CUB4D22	GP2-333-222	PT4222	4TM-D22	
C69	150	500	250159-99	1468-00015		MCE236		MCE236		
C70	.1	600	250212-13	P688-1		CUB6P1		PT601	6TM-P1	
C71A	1000		#250188-1	#PA-110	#PC-100	#115TM1	#1405-01		#V-1	
B	1000									
C	5000									
C72	.0047	600	250211-5	P688-0047	D6-472	CUB6D47	GP2-333-472	PT6347	6TM-D47	
C73	2400	500	250160-3047	1468-0025		MCE460		MCE460		
C74	.001	600	250212-2							
C75	.047	400	250212-3							
C76	.1	400	250211-13	P488-1		DF-104	CUB4P1		PT401	4TM-P1
C77	.047	400	250211-11	P488-047		DF-503	CUB4D47		PT4147	4TM-D47
C78	.0033	600	250211-4	P688-0033		D6-332	CUB6D33	GP2-333-332	PT6333	6TM-D33
C79	.001	400	250212-2							
C80	.001	400	250212-2							
C81	.015	100	250211-1							
C82	.047	200	250211-5							
C83	.0047	400	250212-4							
C84	1000	500	250159-123	1468-001			IR5D1		MC8255	MS-21	Note 1
C85	3900	500	250161-5041	1468-004			IR5D4		MC4563	MS-34	
C86	360	500	250159-5080				SR5T36				Note 2
C87	.001	400	250211-1	P488-001		D6-102	CUB4D1	GP2-333-102	PT421	4TM-D1	
C88	470	500	250159-2063	1468-0005			SR5T47			MS-35	
C89	.0047	600	250211-5	P688-0047		D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C90	.047	600	250211-11	P688-047		DF-503	CUB6S47		PT6147	6TM-S47	
C91	.047	400	250211-11	P688-047		DF-503	CUB6S47		PT6147	6TM-S47	
C92	.047	400	250211-11	P688-047		DF-503	CUB6S47		PT6147	6TM-S47	
C93	.1	600	250201-13	P688-1		DF-104	CUB6P1		PT601	6TM-P1	
C94	1000										
C95	10000		250219-2	BPD-01	DD-103	K062	811-01	DC-511	5HK-S1	
C96	10000		250219-2	BPD-01	DD-103	K062	811-01	DC-511	5HK-S1	
C97	82	500	250159-2045			22R5082					Note 2

Note 1. Not used in all versions
Note 2. CT versions will use a 91MMF ② 500V in this application.
Note 3. In some versions C62A is 5000MMF and C62B is not used.
* Items C71A, C71B, C71C, R90A, R90B, R90C are combined in one unit.

CONTROLS

ITEM No	RATING RESISTANCE	RATING WATTS	MAGNOVOX PART No	IRC PART No	CLAROSTAT PART No	CENTRALAB PART No	MALLORY PART No	INSTALLATION NOTES
R1A	25KΩ		D220126-38	Q11-120	A47 25K-S	B-26	U-20	Horiz. Hold
B	Shaft		Not Req.	VQ	DFS-1/4	Not Req.	Not Req.	Attach to R1A
R2A	50KΩ		D220138G-1	Q11-123	A47-50K-S	B-31	U-35	Brightness - Note 1
B	Shaft		Not Req.	VQ	DFS 1 4	Not Req.	Not Req.	Attach to R2A
R3A	1Meg		D220125-39	Q11-137	A47-1Meg-S	B-69	U-54	Vert. Hold
B	Shaft		Not Req.	VQ	DFS-1/4	Not Req.	Not Req.	Attach to R3A
R4A	750Ω		D220126-38	Q17-105	A47-750-S	AB-415	U-3	Contrast
B	Shaft		Not Req.	Not Req.	FS-3	AK-3	Not Req.	Attach to R4A
C	Switch		Not Req.	T6-1	SWE-13	KB-1	US-38	Attach to R4A
R5A	30KΩ		D220146-1	Q11-130	A47-30K-S	AB-28	U-39	Horiz. Drive -Note 2
B	Shaft		Not Req.	Not Req.	FAS-1, 4	AK-1	Not Req.	Attach to R5A
R6	3000Ω		220120-3		39-3000			Vert. Linearity Wire-Wound
R7A	2.5Meg		D220145-2	Q11-239	A47-2.5Meg-S	AB-83	U-255	Height - Note 3
B	Shaft		Not Req.	Not Req.	FAS-1/4	AK-1	Not Req.	Attach to R7A

Note 1. Some versions may use an alternate control part no. 220126-37
Note 2. Some versions may use an alternate control part no. 220126-41.
Note 3. Some versions may use an alternate control part no. 220126-40.

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	MAGNOVOX PART No.	IRC PART No.	NOTES
R8	100KΩ	½	230104-86	BTS-100K	
R9	100KΩ	½	230104-86	BTS-100K	
R10	22KΩ	½	230104-78	BTS-22K	
R11	1200Ω	½	230105-63	BTA-1200	
R12	100Ω	½	230104-50	BTS-100	
R13	100Ω	½	230104-50	BTS-100	
R14	220Ω	½	230104-54	BTS-220	
R15	150KΩ	½	230104-90	BTS-150K	
R16	100KΩ	½	230104-86	BTS-100K	
R17	470kΩ	½	230104-94	BTS-470K	
R18	470KΩ	½	230104-94	BTS-470K	
R19	100Ω	½	230104-62	BTS-1000	
R20	100Ω	½	230104-50	BTS-100	
R21	100KΩ	½	230104-86	BTS-100K	
R22	22KΩ	½	230104-78	BTS-22K	
R23	470KΩ	½	230104-94	BTS-470K	
R24	470KΩ	½	230104-94	BTS-470K	
R25	10KΩ	½	230104-74	BTS-10K	
R26	1000Ω	½	230104-62	BTS-1000	
R27	6800Ω	½	230104-72	BTS-6800	
R28	22KΩ	½	230104-78	BTS-22K	
R29	22KΩ	½	230104-78	BTS-22K	
R30	6800Ω	½	230105-72	BTA-6800	
R31	33KΩ	½	230104-80	BTS-33K	
R32	330KΩ	½	230104-82	BTS-330K	
R33	68KΩ	½	230104-84	BTS-68K	
R34	3300Ω	½	230104-66	BTS-3300	
R35	1800Ω	½	230104-52	BTS-180	
R36	27KΩ	½	230105-79	BTA-27K	
R37	27KΩ	½	230105-79	BTA-27K	
R38	27KΩ	½	230105-79	BTA-27K	
R39	27KΩ	½	230105-79	BTA-27K	
R40	1200Ω	½	230105-63	BTA-1200	
R41	1000Ω	½	230104-62	BTS-1000	
R42	39KΩ 5%	½	230094-197	BTS-39K 5%	
R43	56Ω	½	230104-47	BTS-56	
R44	560Ω	½		BTS-560	Note 1
R45	1000Ω	½	230104-62	BTS-1000	
R46	82KΩ 5%	½	230094-181	BTS-82KΩ 5%	
R47	56Ω	½	230104-47	BTS-56	
R48	560Ω	½		BTS-560	Note 1
R49	10KΩ 5%	½	230094-183	BTS-10K 5%	
R50	220Ω	½	230104-54	BTS-220	
R51	560Ω	½		BTS-560	Note 1
R52	56000 5%	½	230094-177	BTS-5600 5%	
R53	560Ω	½		BTS-560	Note 1
R54	22KΩ	½		BTA-22K	
R55	330KΩ	½	230104-92	BTS-330K	
R56	470KΩ	½	230104-94	BTS-470K	
R57	270KΩ	½	230104-91	BTS-270K	
R58	18KΩ	½	230104-77	BTS-18K	
R59	3300Ω	½	230105-66	BTA-3300	

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	MAGNOVOX PART No	IRC PART No.	NOTES
R60	33000Ω 5%	½	230095-171	BTA-3300 5%	
R61	47KΩ	½	230104-82	BTS-47K	
R62	15KΩ	½	230105-26	BTB 15K	
R63	330KΩ 5%	½	230094-219	BTS-330K 5%	
R64	470kΩ	½	230104-94	BTS-470K	
R65	10Meg 5%	½	230094-255	BTS-10Meg 5%	
R66	100KΩ 5%	½	230094-207	BTS 100K 5%	
R67	56KΩ 5%	½	230094-201	BTS-56K 5%	
R68	470KΩ	½	230104-94	BTS-470K	
R69	1000Ω	½	230104-62	BTS-1000	
R70	270KΩ	½	230104-91	BTS-270K	
R71	47KΩ	½	230104-82	BTS-47K	
R72	1000Ω	½	230104-62	BTS-1000	
R73	33KΩ	½	230104-80	BTS-33K	
R74	47Ω	½	230104-46	BTS-47	
R75	33KΩ	½	230104-80	BTS-33K	
R76	20KΩ 5%	½	230094-190	BTS-20K 5%	
R77	10KΩ	½	230104-74	BTS-10K	
R78	4.7Meg	½	230104-106	BTS-4.7Meg	
R79	470KΩ	½	230104-94	BTS-470K	
R80	330KΩ	½	230104-92	BTS-330K	
R81	68KΩ	½	230104-84	BTS-68K	
R82	330KΩ	½	230104-92	BTS-330K	
R83	1500Ω	½	230104-64	BTS-1500	
R84	1Meg	½	230104-98	BTS-1Meg	
R85	22KΩ	½		BTA-22K	
R86	2700Ω 5%	½	230094-169	BTS-2700 5%	
R87	330Ω	½	230104-56	BTS-330	
R88	3300Ω 5%	½	230094-171	BTS-3300 5%	
R89	150Ω	½	230104-52	BTS-150	
R90A	22KΩ	½		BTS-22K	
B	8200Ω	½	#250198-1	BTS-8200	
C	8200Ω	½		BTS-8200	
R91	4.7Meg	½		BTS-4.7Meg	

Note 1: Some versions may use a 470Ω resistor in this application.
* Items R90A, R90B, R90C, C71A, C71B and C71C are combined in one unit.

TRANSFORMER (POWER)

ITEM No	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA MAGNOVOX PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC	580VCT	5VAC	300072-1	P-8333					
	a 1.6oA	.225ADC	a 3A							
	SEC. 3	SEC. 4	SEC. 5							
	6.3VAC	6.3VAC								
	a .28A	a 9.3A								

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	MAGNOVOX PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T2	Horiz. Output Trans.	300580-1	A-8220* ①	HVO-9* & MWC-1 ④	D-35 *	232T1 *	FB414 * & RF800 ⑤	FLY-8 * & WC-20 ④
T3	Vert. Output Trans.	320067	A-8141	A-3081	A-104X	238T1	21H08	26E54
T4	Yoke-Horiz.(28.5MH)	320067-1 ③	300587-1	MDF-73 ⑤	Y-22 ⑥	222DI ⑤	DF805 ⑦	Y-9 ⑤
T5	Vert.(31MH) Horiz.Linearity (.7-6.5MH)	300587 ④ 300586	WC-8 ⑧	WC-12 ⑧⑩	21HI ⑧	RF800 ⑧	WC-18 ⑧	
T6A	Width Coil (4.4-29MH)	300585-1						
B	Width Coil (.35-2.3MH)							

① Fabricate new mounting plate.
② Drill new mounting holes.
③ Alternate vertical output transformers.
④ Alternate deflection yoke.
⑤ Remove horizontal damping network and connect blue lead of original yoke to terminal #2 or #7.
⑥ Use original yoke network.
⑦ Jumper terminals #2 and #7 and connect as in original circuit.
⑧ Drill new mounting hole or use original slider and core.
⑨ Connect to coded blue and red terminals.
⑩ Connect to coded #3 and #4 terminals.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Stancor Replacement Connections	Merit Replacement Connections	Triad Replacement Connections	RCA Replacement Connections	Halldorson Replacement Connections	Thordarson Replacement Connections
1	5	9	10	10	2	2
2	7	8	8	8	8	8
T	6	See Note ⑪	See Note ⑪	See Note ⑪	7	7
4	1	1	3	3	6	6
5	8	MWC-1 Red Term.	2	2	RF800 #1 Term.	WC-20 #1 Term.
7	7	MWC-1 Blue term.	1	1	RF800 #3 Term.	WC-20 #4 Term.
5 & 7	7 & 8	MWC-1 Orange & Black Terms. 3 & 1	2 & 1	2 & 1	RF800 #3 & #6 Terms. 5 & 6	WC-20 #1 & #2 Terms. 5 & 6
Special Notes		⑫		⑬	⑫	⑫

⑪ Connect a 47MMF capacitor from terminal #7 (Merit),terminal #8 (Triad, RCA) (Red lead of yoke) to open end of R187 (original terminal "T" connection).
⑫ Remove original width coil and jumper (R18). If the picture is out of phase reverse primary or secondary of replacement width coil.
⑬ Connect terminal "T" to terminal 9.

COILS (RF-IF)

ITEM No.	USE	DC RES PRI	DC RES SEC	REPLACEMENT DATA MAGNOVOX PART No	MEISSNER PART No	MERIT PART No	MILLER PART No	NOTES
L1	UHF Ant. Coil	0Ω	0Ω					
L2	UHF Ant. Coil End Indictor	0Ω		380415-44				
L3	UHF Trap	0Ω						
L4	UHF Mixer Coil	0Ω						
L5	UHF Mixer Coil End Indictor	0Ω						
L6	UHF Osc. Coil	0Ω						
L7	UHF Osc. Coil End Indictor	0Ω						
L8	UHF Osc. Coil	0Ω						
L9	UHF Cathode Choke	0Ω		380522-7				
L10	UHF Fil. Choke	0Ω		380574-8				
L11	UHF Fil. Choke	0Ω		380574-8				
L12	UHF RF Choke	0Ω		380574-8				
L13	UHF RF Coupling Coil	0Ω		380522-8				
L14	UHF IF Input Coil	0Ω		380571-1				
L15	UHF RF Choke	0Ω		380522-5				
L16	UHF Fil. Choke	0Ω		380574-8				
L17	UHF Fil. Choke	0Ω		380574-10				
L18	UHF Output Coil	0Ω		380572-1				
L19	VHF IF Trap	0Ω		380415-84				
L20	VHF IF Trap	0Ω		380415-84				
L21	VHF Ant. Trans.	0Ω CT	0Ω	380490-2				Channel 13 position
L22	VHF Ant. Coil	0Ω						
L23	VHF Ant. Coils	0Ω						
L24	VHF RF Choke	3Ω		380372-6				3 3 Microhenries; IRC part no CLA
L25	VHF Fil. Choke	.22Ω						.47 Microhenries, IRC part no. CLA
L26	VHF Neut. Coil	0Ω		380415-66				Channel 13 position
L27	VHF RF Coil	0Ω						
L28	VHF RF Coils	0Ω						
L29	VHF Mixer Grid Coil	0Ω						Channel 13 position
L30	VHF Mixer Grid Coils	0Ω						
L31	VHF Osc. Coil	0Ω						Channel 13 position
L32	VHF Osc. Coils	0Ω						
L33	VHF Fil. Choke	.22Ω		380372-1				.47 Microhenries; IRC part no. CLA
L34	VHF Conv. Plate	.1Ω		380540-1				
L35	1st Video IF	1Ω		380540-1	17-4524*		6219*	
L36	2nd Video IF	1Ω	.1Ω	380581-1	17-4522		6229	
L37	3rd Video IF	.1Ω	.1Ω	380582-1			6333A	
L38	4th Video IF	.1Ω	.1Ω	380583-1				Includes 47.25MC trap Contains M3, two series peaking coils & a 5MMF cap.
L39	Shunt peaking Coil	1Ω		380443-28	19-3300	TV-188	6174	450 Microhenries
L40	Series peaking coil	9.5Ω		380443-31	19-3300*		6155*	340 Microhenries; Wound on 100KΩ resistor
L41	Shunt peaking coil	9.5Ω		380443-30	19-3300	TV-185	6155	310 Microhenries
L42	Shunt peaking coil	7.5Ω		380443-29	19-3250*	TV-185*	6181*	240 Microhenries, wound on 10KΩ resistor
L43	4.5MC trap	.4Ω		380584-1	20-1005	TV-151	1470	
L44	Sound IF	.5Ω		380584-1	17-3400	TV-151	1469	
L45	Ratio Det.	5.5Ω	1.8ΩCT	380588-1	17-3497	TV-115	6205	Tertiary winding- 7Ω
L46	Horiz. Osc.	55Ω		380579-1	19-1576	TV-163	6210	

* Use winding with 56KΩ shunt resistor.
■ Use one winding only.
▲ Use adaptor plate.
+ Parallel with 100KΩ resistor.
▲ Parallel with 10KΩ resistor.

FILTER CHOKE

ITEM No	TOTAL DIRECT CURRENT	RATINGS D C RESISTANCE	RATINGS INDUCTANCE @ CURRENT 1000 ⑭	REPLACEMENT DATA MAGNOVOX PART No	Stancor PART No	Merit PART No	Triad PART No	Halldorson PART No	Thordarson PART No
L47	.225A	38.5Ω	.43HY	320058-1	C-2326 ①	C299I ①	C-21X ①		26C44

① Drill one new mounting hole.

FUSES

ITEM No	TYPE	RATING	REPLACEMENT DATA MAGNOVOX PART No FUSE	MAGNOVOX PART No HOLDER	LITTELFUSE PART No FUSE	LITTELFUSE PART No HOLDER	BUSS PART No FUSE	BUSS PART No HOLDER
M1	3AG S, B	150MA 125V	180157-24		313.150 (USMA-3AG-S/B)	357001	MDL15 100	4405

MAGNAVOX MODELS
CMUB422BC, CTB422BC (Ch. 300 Series)

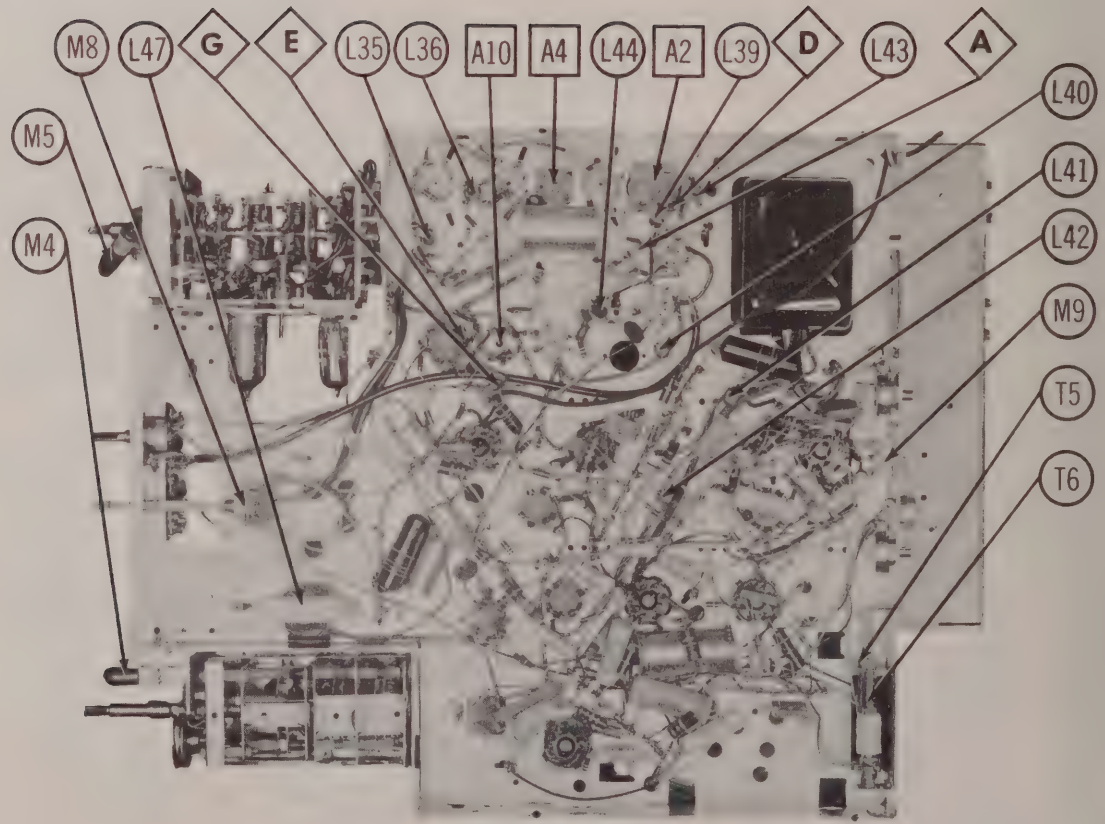
PARTS LIST AND DESCRIPTIONS (Continued)

CRYSTAL DIODES

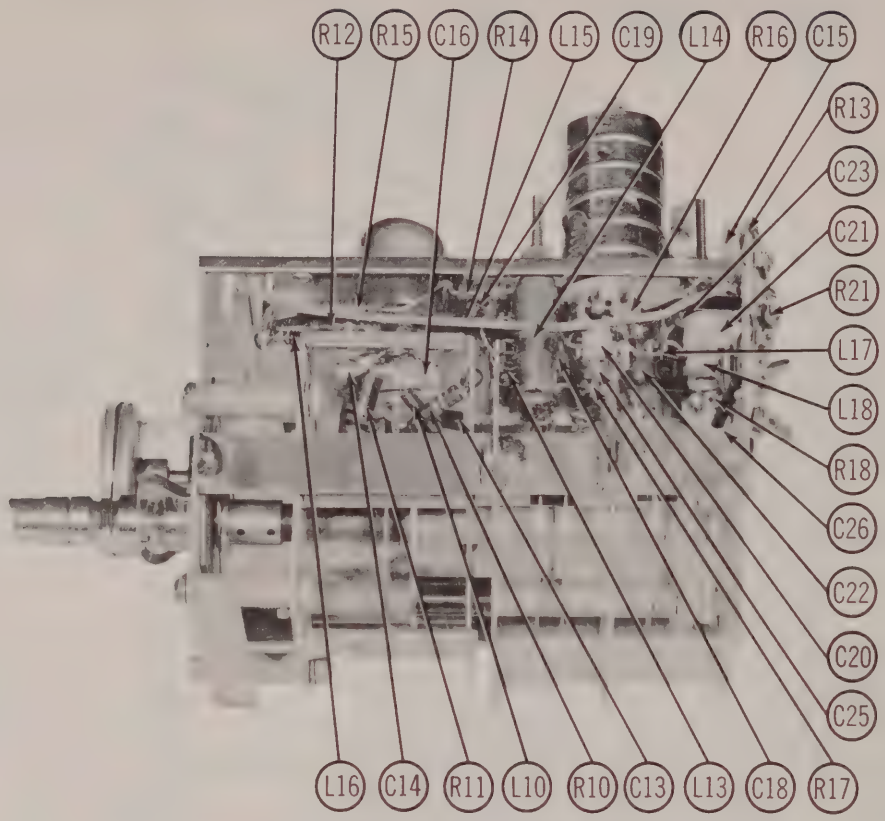
ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		MAGNAVOX PART No.	SYLVANIA PART No.	FEDERAL PART No.	
M2	1N124	530036-1	1N82 or 1N82A		UHF Mixer
M3	1N64		1N60 or 1N132	1N60 or 1N64A	Video Det.

MISCELLANEOUS

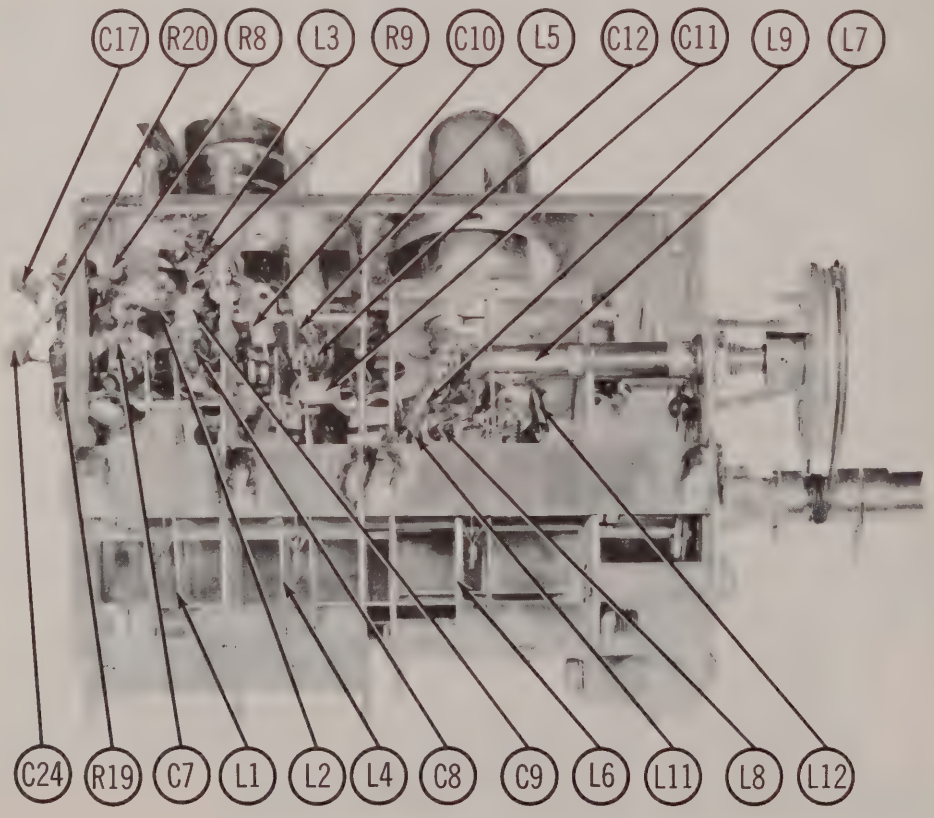
ITEM No.	PART NAME	MAGNAVOX PART No.	NOTES
M4	Dial Light		#47, Bayonet - UHF Tuner
M5	Dial Light		#47, Bayonet - VHF Tuner
M6	Tuner	700379-32	VHF - CT & CU Models
	Tuner	700379-42	VHF - CMU Models
M7	Tuner	700426-22	UHF - CMU Models
M8	Switch	160238-1	VHF-UHF
M9	Switch	160229-1	Fringe - Local
M10	Focus Magnet	360569-1	Includes centering device
M11	Ion Trap	360492-2	



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR & ALIGN. IDENTIFICATION



UHF TUNER-RIGHT SIDE



UHF TUNER-LEFT SIDE

TROUBLE SHOOTING AIDS (cont)

L. F. HAWKENSHIP
DENVER, COLORADO

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V17, V18, V19 and V20. Check M1 fuse. Check waveform W16.

If Satisfactory	If Unsatisfactory
Check T2, T4A, T5, T6, C91, C92, C90, R113, R114 and other associated components.	Check L46, C85, C86, C89, R105, R108, R106 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V18, V19 and V22. Check C1B, C89, C90, R113 and R114. Check B+ filter and decoupling network.

BLOOMING

Check by substitution V18, V19, V20 and V22. Check C89, R113, R114 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER, NO SOUND, NO PICTURE (VHF)

Check by substitution V3, V4, V5, V6, V7 and V8. Check video IF components for failure or change of value.

RASTER, NO SOUND, NO PICTURE (UHF)

Check by substitution V1 and V2.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

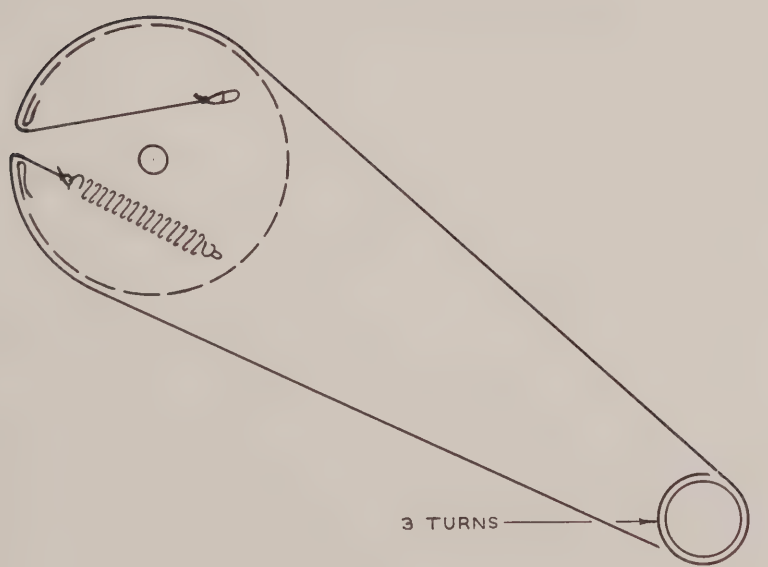
KEYSTONE EFFECT

Check T4 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



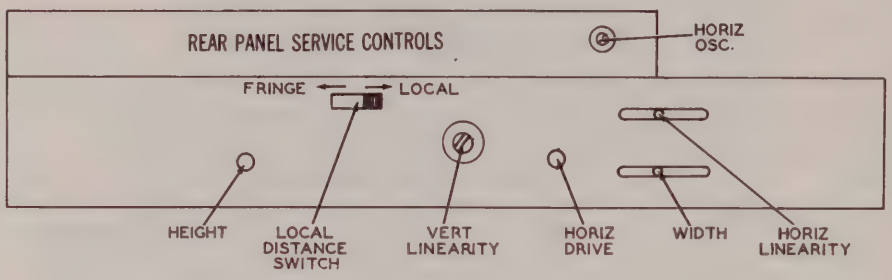
FINE TUNING SHAFT IN MAX. COUNTERCLOCKWISE POSITION.

UHF DRIVE CORD STRINGING

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF Tuner Oscillator Circuit may be accomplished by removing the Channel Selector and Fine Tuning knobs.

SERVICE ADJUSTMENT LOCATION



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the Horiz. Oscillator Circuit can be made from the rear panel of the chassis. Set the Horiz. Hold Control at the Mid-position of its range and adjust the Horiz. Osc. slug L46 until the picture synchronized horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate Sound IF Detector Buzz, adjust the Ratio Detector Secondary L45 located on top of chassis. (See tube placement chart.)

FUSES

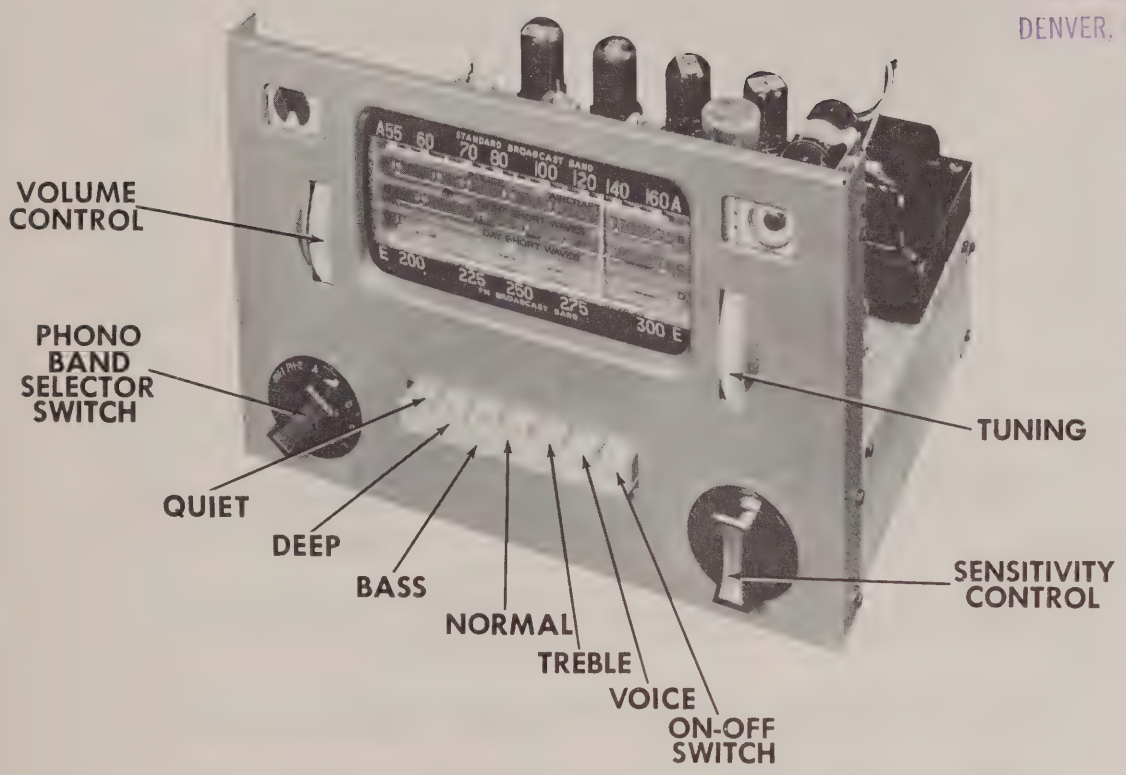
One fuse is used for Horiz. Sweep Protection. (For location see Tube Placement Chart.)

CENTERING

Centering is accomplished mechanically by means of a centering lever on the P. M. Focusing assembly. Adjust the centering lever from side to side, and up and down until the picture is properly centered.

PROPERTY OF
L. F. BLANKENSHIP
3644 MEADE ST.
DENVER, COLORADO

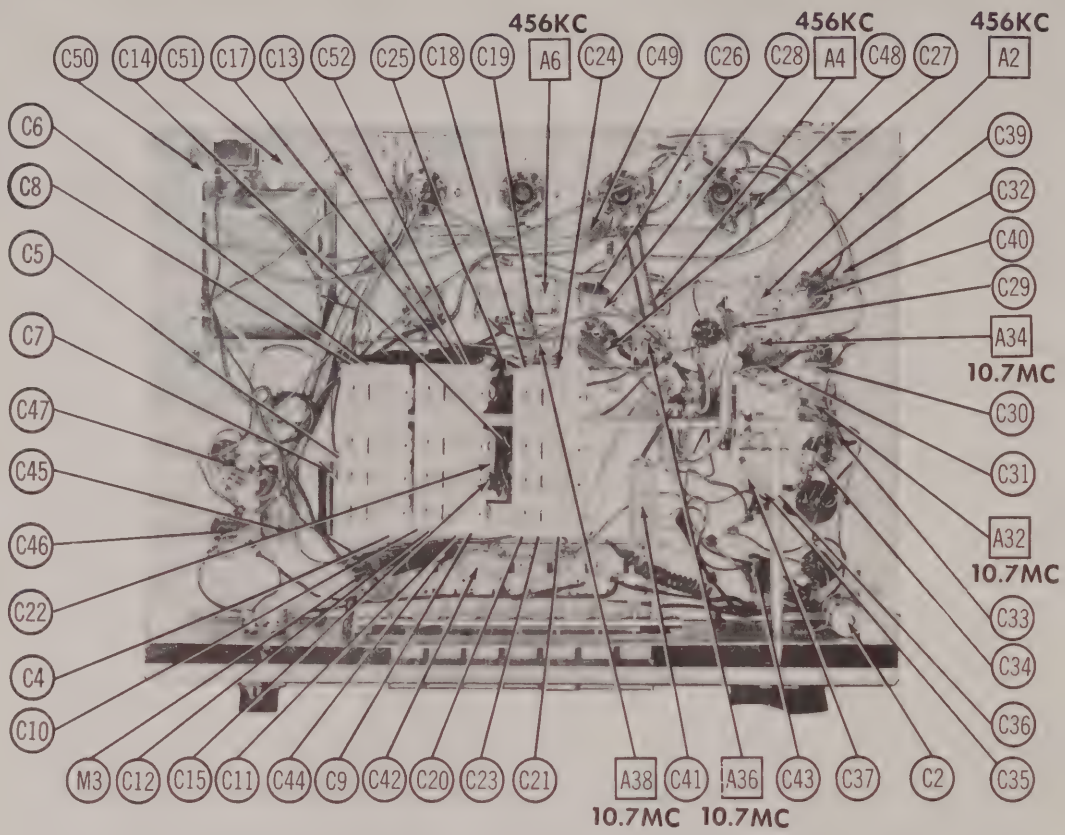
PROPERTY OF
L. F BLANKENSHIP
3020 MEADE ST.
DENVER, COLORADO



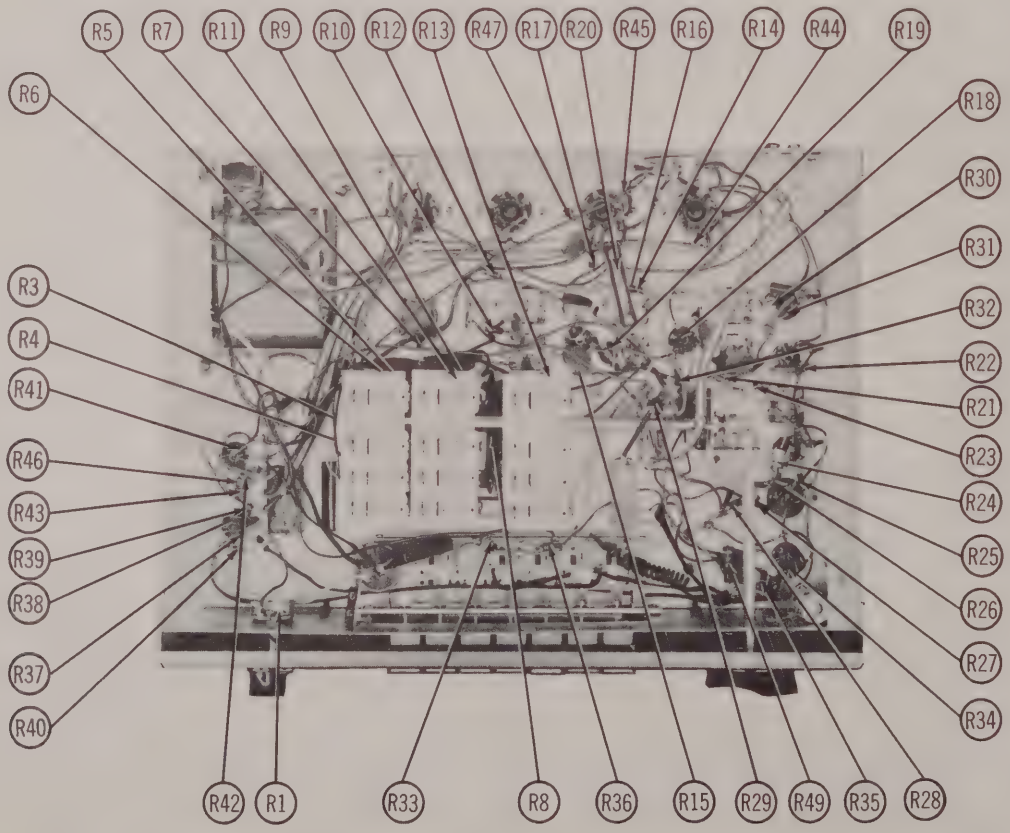
TRADE NAME	Midwest Chassis KD-16, RN-16		
MANUFACTURER	Midwest Radio & Tel. Corp., 909 Broadway, Cincinnati 2, Ohio		
TYPE SET	AC Operated Multi-Band AM-FM Superheterodyne Receiver		
TUBES	Sixteen		
POWER SUPPLY	110-120 Volts AC - 50/60 Cycles	RATING	1.1Amp. @ 117 Volts AC
TUNING RANGE	Band "A" (540-1600KC) AM		Band "C" (4.7-10MC) AM
	Band "B" (1.6-4.7MC) AM		Band "D" (11-22MC) AM
	BAND "E" (88-108MC) FM		

MIDWEST
CHASSIS KD-16, RN-16

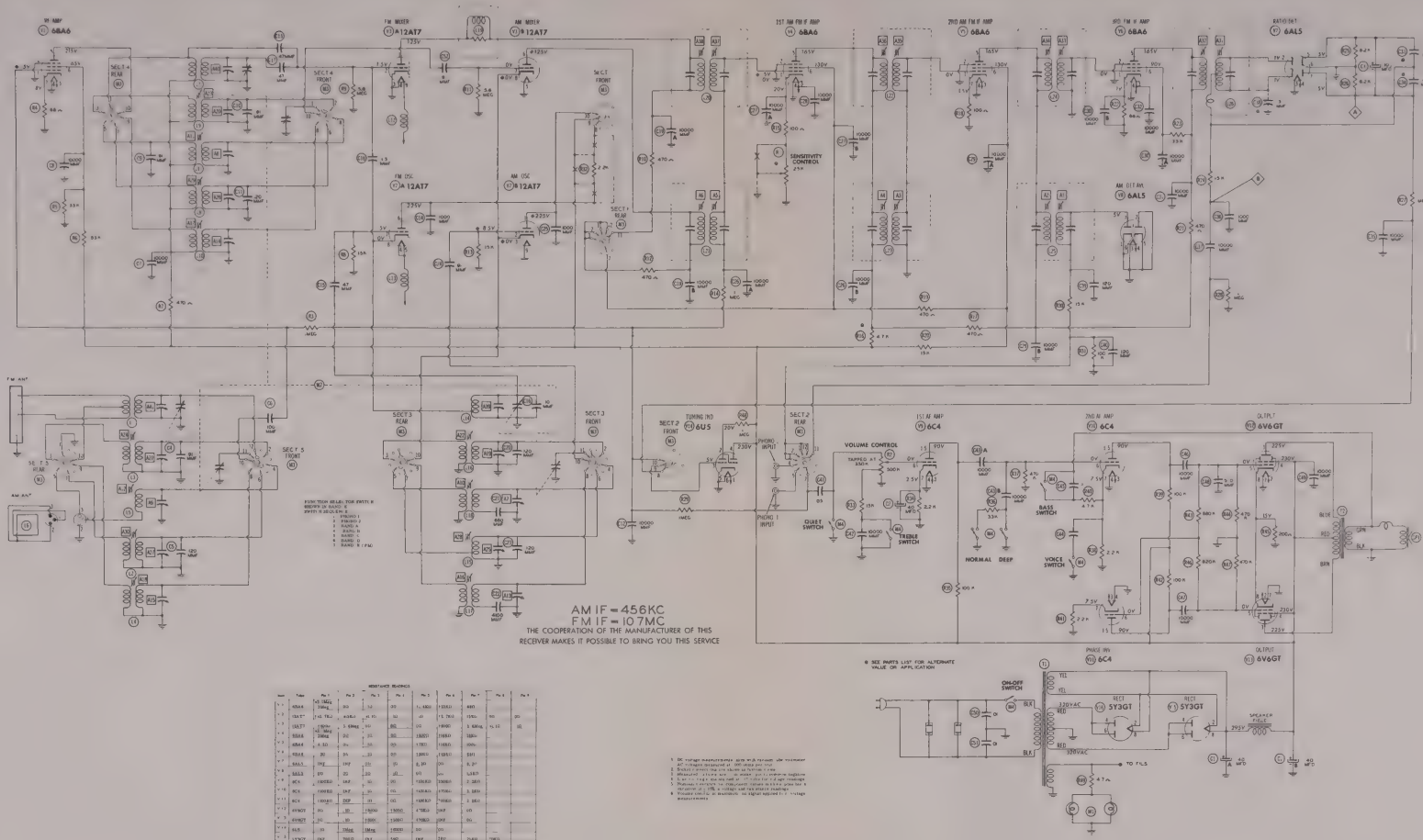
"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1955 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



A PHOTOFACT STANDARD NOTATION SCHEMATIC
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263-10

ALIGNMENT INSTRUCTIONS

AM ALIGNMENT

With tuning gang fully closed set dial pointer approximately 1/8" to the left of the index mark at "55" on the broadcast dial scale (Band "A").
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01MFD	High side to pin 7 (grid) of 12AT7 (V3). Low side to chassis.	456KC (400~ Mod.)	Band "A"	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4, A5, A6	Adjust for maximum output.
2		Loop	1500KC	"	1500KC	"	A7, A8, A9	"
3		"	550KC	"	550KC	"	A10, A11 A12	Adjust for maximum output. Repeat step 2.
4		"	4.7MC	Band "B"	4.7MC	"	A13, A14 A15	Adjust for maximum output.
5		"	1.6MC	"	1.6MC	"	A16, A17 A18	Adjust for maximum output. Repeat step 4.
6		"	10.0MC	Band "C"	10.0MC	"	A19, A20 A21	Adjust for maximum output.
7		"	5.0MC	"	5.0MC	"	A22, A23 A24	Adjust for maximum output. Repeat step 6.
8		"	22.0MC	Band "D"	22.0MC	"	A25, A26 A27	Adjust for maximum output.
9		"	11.5MC	"	11.5MC	"	A28, A29 A30	Adjust for maximum output. Repeat step 8.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.
Use only enough sweep generator output to provide usable indication on scope.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
10.	.01MFD	High side to pin 1 (grid) of 6BA6 (V5). Low side to chassis.	10.7MC (450KC Swp)	Band "E"	Point of non-interference	Vert. Amp. to point (A). Low side to chassis.	A32, A33 A34	Disconnect stabilizing capacitor C3. Adjust for maximum amplitude over coupled response curve with band width as shown in Fig. 1.
11.	"	High side to pin 1 (grid) of 6BA6 (V4). Low side to chassis.	"	"	"	"	A35, A36	"
12.	"	High side to pin 2 (grid) of 12AT7 (V3). Low side to chassis.	"	"	"	"	A37, A38	"
13.	"	"	"	"	"	Vert. Amp. to point (B). Low side to chassis.	A31	Reconnect stabilizing capacitor C3. Adjust for curve of maximum amplitude and symmetry similar to Fig. 2. SLIGHTLY retouch A32 for maximum amplitude and straightness of cross-over lines.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
14.	Two 150Ω Carbon Resistors	Across antenna terminals "A-A" with 150Ω in each lead.	105MC (Unmod)	Band "E"	105MC (2nd. index mark to right of "275" on Band "E" dial scale).	DC probe to point (A). Common to chassis.	A39, A40 A41	Adjust for maximum deflection.
15.	"	"	90MC (Unmod)	"	90MC (2nd. index mark to right of "200" on band "E" dial scale).	"	L14, L7, L1	If necessary, adjust in order given by compressing or expanding coil turns. Repeat step 14.

FIG. 1

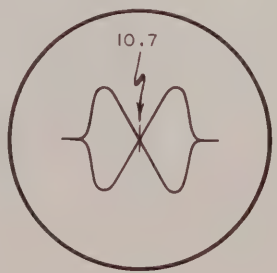


FIG. 2

PARTS LIST AND DESCRIPTIONS (Continued)

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: MIDWEST PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amp.	6BA6	6BA6	7BK	
V2	Osc.	12AT7	12AT7	9A	
V3	Mixer	12AT7	12AT7	9A	
V4	1st AM FM IF Amp.	6BA6	6BA6	7BK	
V5	2nd AM FM IF Amp.	6BA6	6BA6	7BK	
V6	3rd FM IF Amp.	6BA6	6BA6	7BK	
V7	Ratio Det.	6AL5	6AL5	6BT	
V8	AM Det-AVC	6AL5	6AL5	6BT	
V9	1st AF Amp.	6C4	6C4	6BG	
V10	2nd AF Amp.	6C4	6C4	6BG	
V11	Phase Inverter	6C4	6C4	6BG	
V12	Output	6V6GT	6V6GT	7S	
V13	Output	6V6GT	6V6GT	7S	
V14	Tuning Indicator	6U5	6U5	6R	
V15	Rect.	5Y3GT	5Y3GT	5T	
V16	Rect.	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MIDWEST PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: MALLORY PART No.	REPLACEMENT DATA: SPRAGUE PART No.	NOTES
C1A	▲40	475		AFH2-72		B053		FP262	TVL-2830	
B	■40	475								
C2	40	25		PRS25/50		BR502		TC29	TVA-1206	
C3	10	150		PRS150/10		BR1015		TC42	TVA-1406	
C4	91	500				22R5Q91			MS-34	
C5	120	500				22R5T12				
C6	100	500		1469-0001		22R5T1		MCE235	MS-31	
C7	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C8	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C9	91	500				22R5Q91			MS-39	
C10	91	500				22R5Q91			MS-39	
C11	120	500				22R5T12				
C12	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C13	47	500		1469-00005		22R5Q47		MCE225	MS-45	
C14	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C15	47	500		1469-00005		22R5Q47		MCE225	MS-45	
C16	10			SII0NP0		22R5Q1		MCE215	MS-41	
C17	47	500		1469-00005		22R5Q47		MCE225	MS-45	
C18	1.5			SII.5NP0	TCZ-1.5	TZ04	NP0K-1R5		5TCCB-V15	
C19A	10000			BPD-2X01	DD3-103	DK082	811-01	DC-511	5HK-2S1	
B	10000						811-01	DC-511		
C20	120	500				22R5T12				
C21	660	500								
C22	4100	500		1464-004		1R5D4		MCE463	MS-24	
C23	120	500				22R5T12				
C24	91	500				22R5Q91			MS-34	
C25	1000			BPD-001	DD-103	K069	801-001	DC-521	5HK-D1	
C26A	10000			BPD-2X01	DD3-103	DK082	811-01	DC-511	5HK-2S1	
B	10000						811-01	DC-511		
C27A	10000			BPD-2X01	DD3-103	DK082	811-01	DC-511	5HK-2S1	
B	10000						811-01	DC-511		
C28	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C29A	10000			BPD-2X01	DD3-103	DK082	811-01	DC-511	5HK-2S1	
B	10000						811-01	DC-511		
C30A	10000			BPD-2X01	DD3-103	DK082	811-01	DC-511	5HK-2S1	
B	10000						811-01	DC-511		
C31	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C32	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C33	47	500		1469-00005		22R5Q47		MCE225	MS-45	Note 2
C34	47	500		1469-00005		22R5Q47		MCE225	MS-45	Note 2
C35	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C36	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C37	1000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C38	3									Note 1
C39	120	500				22R5T12				
C40	120	500				22R5T12				

(CONT'D ON NEXT PAGE)

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MIDWEST PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: MALLORY PART No.	REPLACEMENT DATA: SPRAGUE PART No.	NOTES
C41	.05	600		P688-05	DF-503	CUB6S5		PT615	6TM-S5	
C42	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C43A	10000			BPD-2X01	DD3-103	DK082	811-01	DC-511	5HK-2S1	
B	10000						811-01	DC-511		
C44	.1	400		P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C45	.1	400		P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C46	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C47	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C48	510	500		1469-0005		5R5T51		MCE245	MS-35	
C49	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C50	.01	1000		1089ZX-01	D6-103	CUB16S1	GP2-333-103	PT1011	MB-S1	
C51	.01	1000		1089ZX-01	D6-103	CUB16S1	GP2-333-103	PT1011	MB-S1	
C52	91	500								

Note 1. Not used in all models.

Note 2: Some versions may use a 91MMF in this application.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MIDWEST PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: MALLORY PART No.	INSTALLATION NOTES
R1A	25KΩ	½	RV-30	Q14-120	A47-25K-V	B-27	U-28	Sensitivity - Note
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
R2	500KΩ	½	RV-28					Volume tapped at 350KΩ

Note. Some models may use an alternate control part no. RV-29.

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MIDWEST PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R3	1Meg	½		BTS-1Meg	
R4	68Ω	½		BTS-68	
R5	33KΩ	½		BTS-33K	
R6	33KΩ	½		BTS-33K	
R7	470Ω	½		BTS-470	
R8	15KΩ	½		BTS-15K	
R9	5.6Meg	½		BTS-5.6Meg	
R10	470Ω	½		BTS-470	
R11	5.6Meg	½		BTS-5.6Meg	
R12	470Ω	½		BTS-470	
R13	15KΩ	½		BTS-15K	
R14	1Meg	½		BTS-1Meg	
R15	100Ω	½		BTS-100	
R16	4700Ω	½		BTS-4700	Note 1
R17	470Ω	½		BTS-470	
R18	100Ω	½		BTS-100	
R19	470Ω	½		BTS-470	
R20	15KΩ	10		1 3/4A-15K	
R21	470Ω	½		BTS-470	
R22	68Ω	½		BTS-68	
R23	33KΩ	½		BTS-33K	
R24	15KΩ	½		BTS-15K	
R25	8200Ω	½		BTS-8200	
R26	8200Ω	½		BTS-8200	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MIDWEST PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R27	1Meg	½		BTS-1Meg	
R28	1Meg	½		BTS-1Meg	
R29	1Meg	½		BTS-1Meg	
R30	15KΩ	½			
R31	100KΩ	½		BTS-100K	
R32	2200Ω	½		BTS-2200	
R33	15KΩ	½			
R34	2200Ω	½		BTS-2200	
R35	100KΩ	½		BTS-100K	
R36	33KΩ	½		BTS-33K	
R37	470KΩ	½		BTS-470K	
R38	2200Ω	½		BTS-2200	
R39	100KΩ	½		BTS-100K	
R40	4700Ω	½		BTS-4700	
R41	2200Ω	½		BTS-2200	
R42	100KΩ	½		BTS-100K	
R43	680KΩ	½		BTS-680K	
R44	470KΩ	½		BTS-470K	
R45	200Ω	3			
R46	820KΩ	½		BTS-820K	
R47	470KΩ	½		BTS-470K	
R48	1Meg	½		BTS-1Meg	
R49	4.7Ω	1			

Note 1. Some models may use a 470Ω resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: MIDWEST PART No.	REPLACEMENT DATA: Stancor PART No.	REPLACEMENT DATA: Merit PART No.	REPLACEMENT DATA: Triad PART No.	REPLACEMENT DATA: Halldorson PART No.	REPLACEMENT DATA: Thordarson PART No.
T1	117VAC	620VCT	5VAC	6.3VAC	TP-8C	PM-8422①	P-3077		P9733 ①	26R33 ②
	ⓐ1.1A	.140ADC	ⓐ4A	ⓐ4.5A						

① Drill new mounting holes.
② Use only one 5V and 6.3V windings.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MIDWEST PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T2	9.8KΩ CT	3.3Ω	1305-1	A-3823	A-2936	S-15X	Z1404	22S56 ①	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	MIDWEST PART No.	JENSEN PART No.	QUAM PART No.	
SP1	12"	PM	3.3Ω	SP-7		12E60	

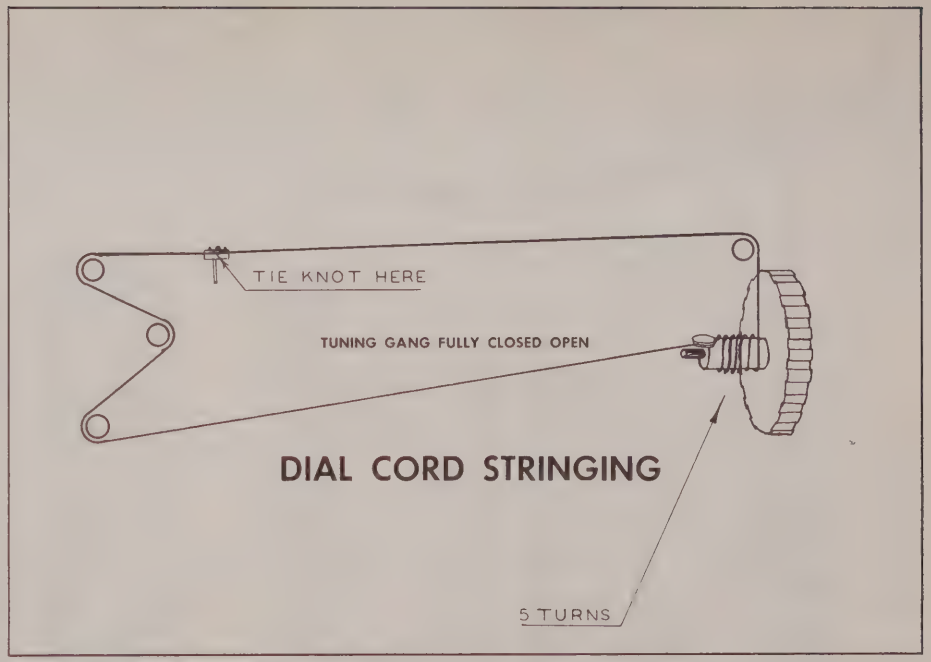
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	MIDWEST PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil							Band E
L2	Ant. Coil							Band D
L3	Ant. Coil							Band C
L4	Ant. Coil							Band B
L5	Ant. Coil							Band A
L6	AM Loop Ant.	1.7Ω						Tapped at .7Ω
L7	RF Coil							Band E
L8	RF Coil							Band D
L9	RF Coil							Band C
L10	RF Coil							Band B
L11	RF Coil							Band A
L12	Fil. Choke							
L13	Fil. Choke							
L14	Osc. Coil							Band E
L15	Osc. Coil							Band D
L16	Osc. Coil							Band C
L17	Osc. Coil							Band B
L18	Osc. Coil							Band A
L19	RF Choke	.1Ω						6 Turns #30 Wire
L20	1st FM IF	.2Ω	.2Ω		16-3487■	FM-254*	1463*	Wound on 470Ω ½W Resistor
L21	1st AM IF	4.8Ω	5.5Ω		16-6758*	BC-352*	12-C1*	
L22	2nd FM IF	.2Ω	.2Ω		16-3487■	FM-254*	1463*	
L23	2nd AM IF	4Ω	4Ω		16-6758*	BC-352*	12-C1*	
L24	3rd FM IF	.2Ω	.2Ω		16-3487■	FM-254*	1463*	
L25	3rd AM IF	4.2Ω	4.8Ω		16-6758*	BC-353*	12-C2*	
L26	Ratio Det.	.2Ω	0ΩCT			FM-255*	1465*	Tertiary winding = .2Ω

* Use adaptor plate.
■ Drill one mounting hole.

MISCELLANEOUS

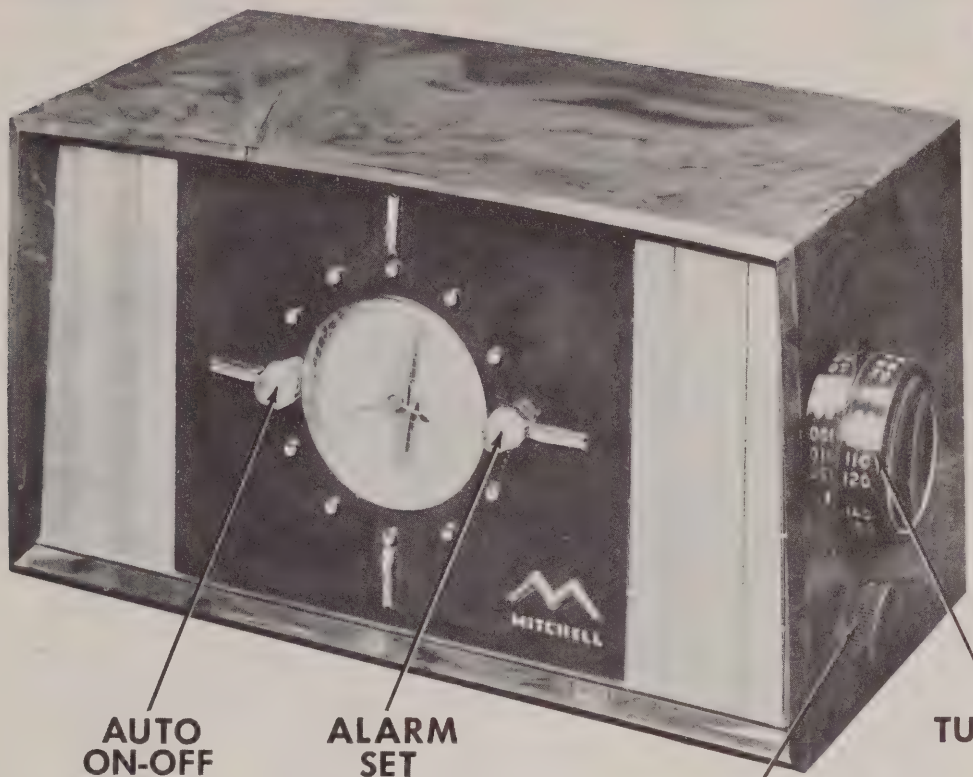
ITEM No.	PART NAME	PART No.	NOTES
M1	Dial Light		#47 (2 used)
M2	Tuning Cap.		
M3	Switch		
M4	Switch Assy.		Tone on-off
	Trimmer Cap.		Ant. Section (4 used)
	Trimmer Cap.		RF Section (4 used)
	Trimmer Cap.		Osc. Section (4 used)



DIAL CORD STRINGING

PROPERTY OF
L. F. BLANKENSHIP
3024 MEADE ST
DENVER, COLORADO

MITCHELL
MODELS 1283, 1284



MITCHELL
MODELS 1283, 1284

TRADE NAME	Mitchell Model 1283, 1284
MANUFACTURER	Mitchell Mfg. Co., 2525 Clybourn Ave., Chicago 14, Ill.
TYPE SET	AC Operated AM Superheterodyne Receiver With Electric Clock
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12AV6 Det-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC - 60 Cycles
RATING	.26 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540 - 1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial. Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-. Loop should be maintained in same relative position to chassis as when receiver is in cabinet. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1MFD	High side to antenna stator lug on tuning gang. Low side to B-	455KC (400~ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2		Loop	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1400KC	Tune to 1400KC signal.	"	A6	"
4		"	600KC	Tune to 600KC signal.	"		If necessary, bend slotted antenna rotor plates for maximum output. Repeat step 3.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

MITCHELL MODEL 1283

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: MITCHELL PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amp.	12BA6	12BA6	7BK	
V3	Det-AVC-RF Amp.	12AV6	12AV6	7BT	
V4	Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MITCHELL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	50	150	11-8873	PRS150/50-30		BBRD5315		TCD497	TVA-2450	Blue
B	30	150								Red
C2	.05	200	11-1345	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C3	.05	200	11-1345	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C4	100		11-6015	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C5	.005	600	11-4894	P688-005	D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5	
C6A	250		♦11-8215	♦PA-112-2	♦PC-71	♦112TM2	♦1406-02		♦T-4	
B										
C	5000									
C7	.01	400		P488-01	C6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C8	.05	400	11-1346	489ZX-05	DF-503	PJ4S5		PT415	4TM-S5	
C9	.05	400	11-1346	489ZX-05	DF-503	PJ4S5		PT415	4TM-S5	

♦ Items C6A, C6B, C6C, R7A and R7B are combined in one unit.
When replacing items seperately, item C6A and C6B should total 250MMF.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MITCHELL PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg with 40KΩ stop.	½	N-9943	Q13-137 *	A47-1Meg-Z *	BSK-70 *	U-53 *	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R1A

* Connect a 39KΩ resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control. (Control viewed from shaft end, terminals down.)

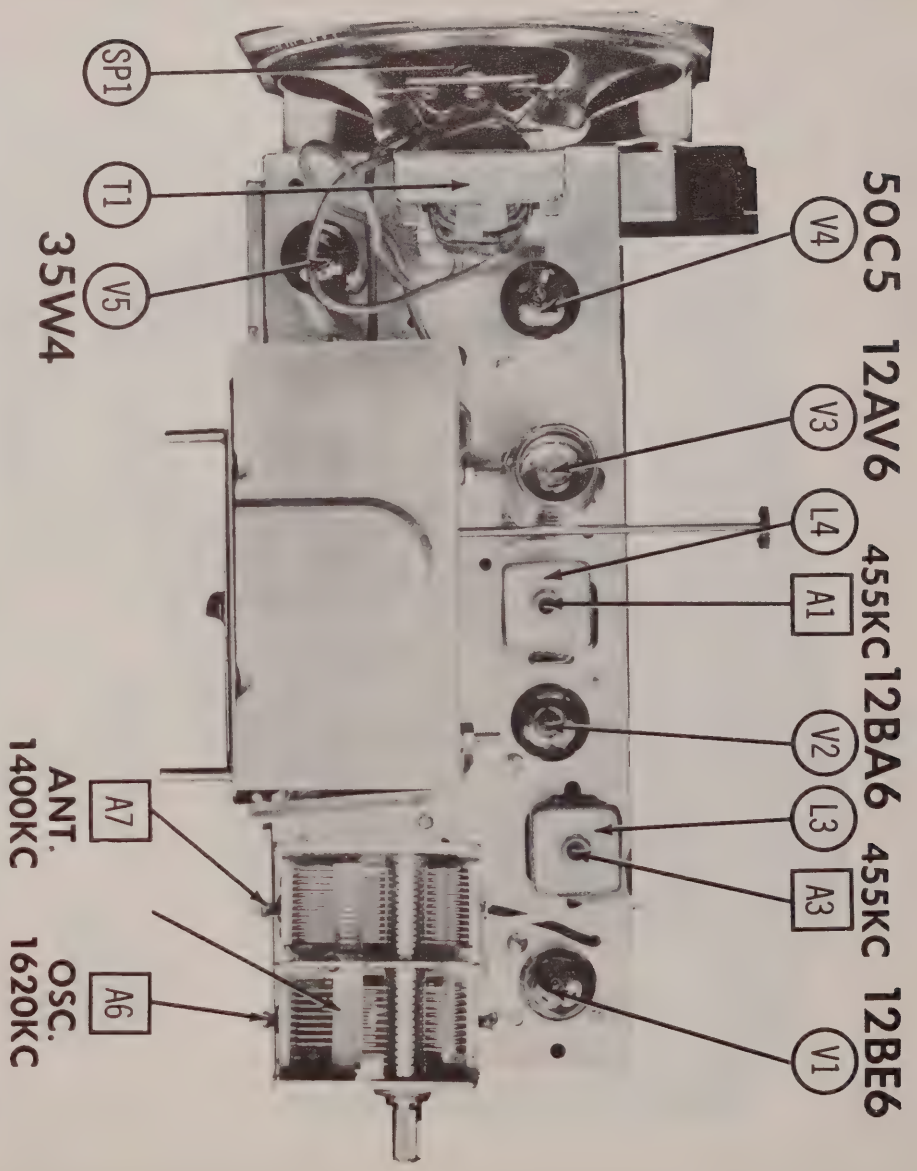
RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MITCHELL PART No.	IRC PART No.	NOTES
R2	22KΩ	½	N-4025	BTS-22K	
R3	2.2Meg	½	N-4424	BTS-2.2Meg	
R4	82Ω	½	N-5857	BTS-82	
R5	47KΩ	½	N-7124	BTS-47K	
R6	6.8Meg	½	N-4028	BTS-6.8Meg	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MITCHELL PART No.	IRC PART No.	NOTES
R7A	220KΩ	½	♦N-8215	BTS-220K	
B	470KΩ	½		BTS-470K	
R8	180Ω	½	N-4067	BTS-180	
R9	1200Ω	1	N-4900	BTA-1200	
R10	33Ω	1	N-4068		

♦ Items R7A, R7B, C6A, C6B and C6C are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MITCHELL PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T1	2.6KΩ	3.7Ω	Part of speaker	A-3332①	A-3025 ①	S-12X ①	Z1101 ①		① Bend mounting tabs down. File out slots, mount on original mounting bracket.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	MITCHELL PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.7Ω	N-7824	ST-113 Mod. P4-X	4A1	

COILS (RF-IF)

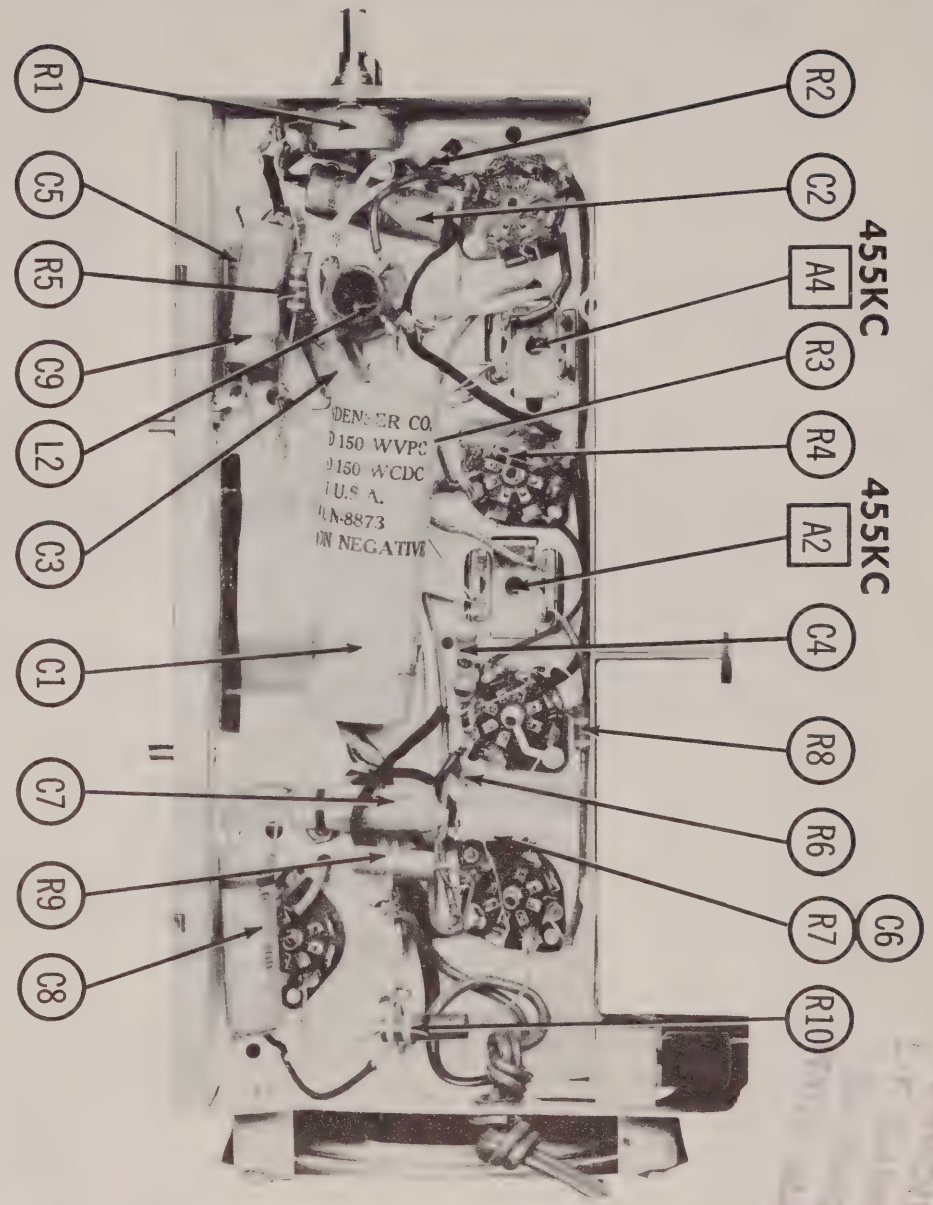
ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	MITCHELL PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	2Ω		N-9949				Includes cabinet back
L2	Osc. Coil	.6Ω	7Ω	N-9953	14-1073*		69-Osc. ■	
L3	Input IF	14Ω	14Ω	N-7981	16-6758	BC-352	12-C1	
L4	Output IF	14Ω	14Ω	N-7981	16-6758	BC-353	12-C2	

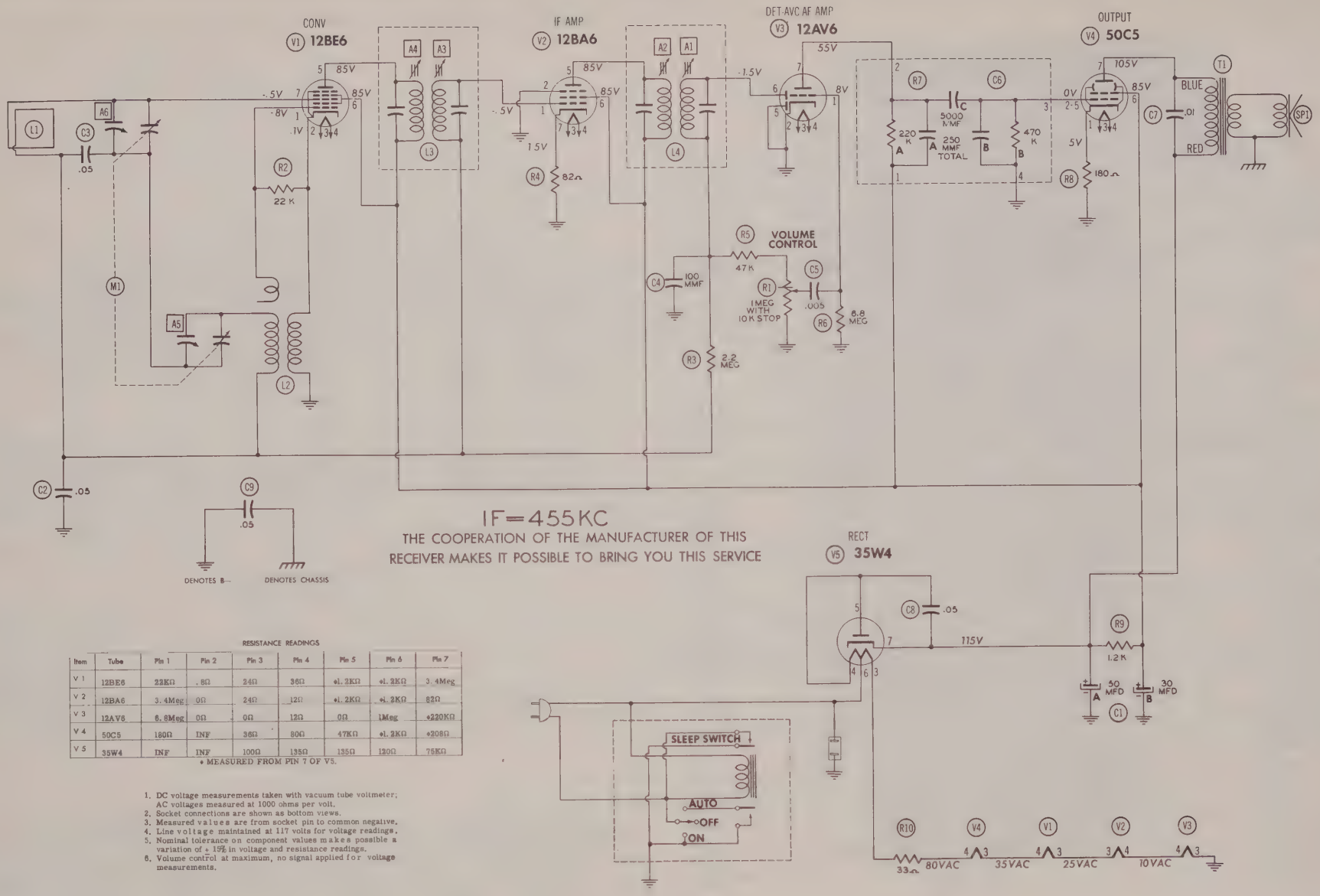
* Leads sufficient mounting support.
■ Drill mounting hole.

MISCELLANEOUS

ITEM No.	PART NAME	MITCHELL PART No.	NOTES
M2	Tuning cap.	N-8675	54-390MMF, 47-152MMF.

CHASSIS—BOTTOM VIEW





IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.8Ω	24Ω	36Ω	+1.2KΩ	+1.2KΩ	3.4Meg
V 2	12BA6	3.4Meg	0Ω	24Ω	12Ω	+1.2KΩ	+1.2KΩ	82Ω
V 3	12AV6	6.8Meg	0Ω	0Ω	12Ω	0Ω	1Meg	+220KΩ
V 4	50C5	180Ω	INF	36Ω	80Ω	47KΩ	+1.2KΩ	+208Ω
V 5	35W4	INF	INF	100Ω	135Ω	135Ω	120Ω	75KΩ

+ MEASURED FROM PIN 7 OF V5.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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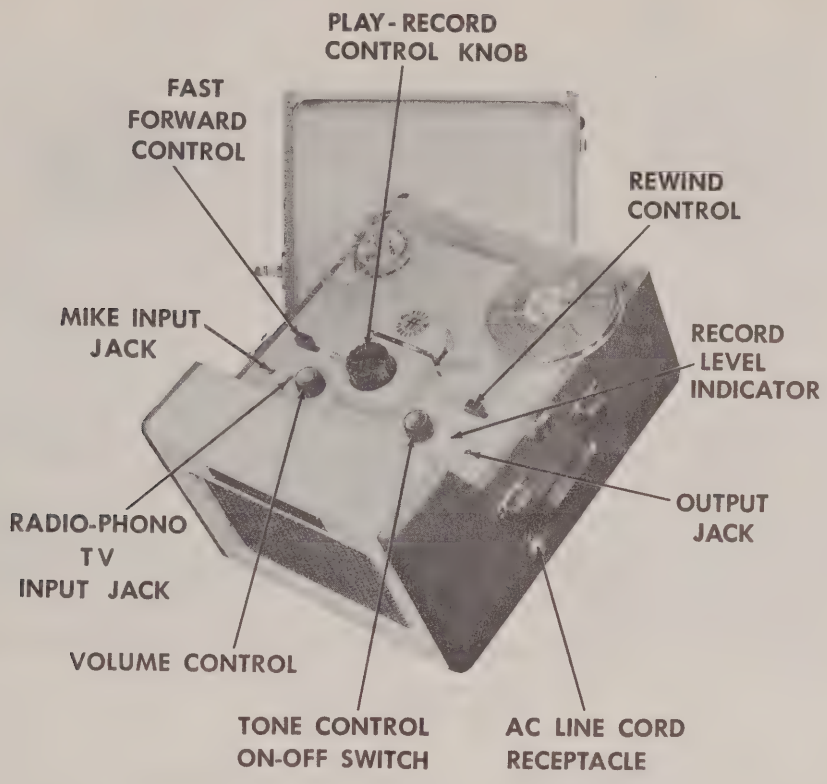

Figure 1

MITCHELL
MODEL 1290

GENERAL INFORMATION

The Mitchell Model 1290 Tape Recorder is designed to record and play back two tracks of material on standard width (1/4") recording tape, which doubles the playing time of a reel of tape with no loss of frequency response or quality. Recordings can be made from a radio, television receiver or phonograph, in addition to those made directly from the microphone. Recordings can be played back through the self-contained speaker or an external speaker through use of the Output Jack.

Model 1290 is designed for a tape velocity of 7 1/2" per second. Using both channels of the tape, the recording time is as follows:

Size Reel	Speed 7 1/2"
5"	1/2 hour
7"	1 hour

This recorder is designed to operate on 60 cycle, 110-120 volts, AC supply only.

CAUTION: Severe Damage Will Result If Connection Is Made To A Direct Current (DC) Line.

Manufactured by:

Mitchell Mfg. Co.
2525 Clybourn
Chicago 14, Ill.

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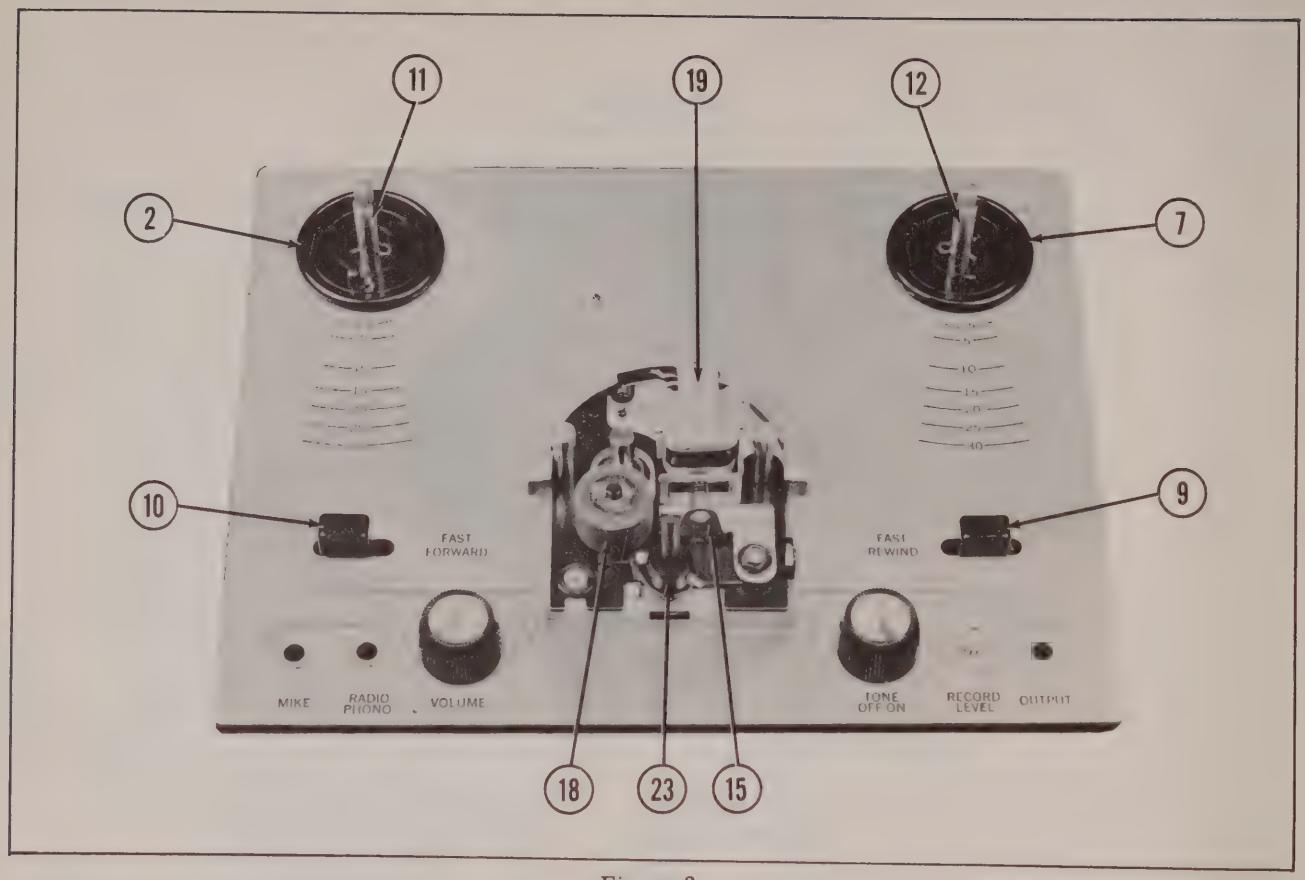

Figure 2

SPECIFICATIONS

Controls: On-Off Tone, Volume, Record-Playback, Fast Forward, Fast Rewind.

Tubes: 5879 Amp., 12AX7 AF Amp., 6V6GT Audio Output and Bias Osc., 6X5GT Rectifier.

Fast Speed -- 5" reel - 45 sec. 7" reel - 90 sec.

Freq. Response -- 65 to 10,000 cycles per sec.

Power Requirements: 110-120 volts - 60 cycle AC only @ 70 watts.

Power Output: 2 watts undistorted - 3 watts max.

Inputs: Mike- 1 Meg. Imp., Radio-Phono .5 Meg. Imp.

Outputs: Int. 5" Speaker, Ext. 3.2Ω Speaker, Ext. 1 Meg. Imp. for Ext. Amp. or Monitor in record.

Bias & Erase Freq: 50 KC.

OPERATING INSTRUCTIONS

1. With the On-Off Tone Control in the "Off" position, insert the AC power cord into the receptacle on the right side of the cabinet (Figure 1).

2. Plug the AC cord into a convenient wall receptacle of the proper rating.

Threading The Tape-

1. Place a reel of tape on the right reel plate (7) and an empty reel on the left reel plate (2) making sure the reel slots engage the pins on the reel plates.

2. Unwind about 10" of tape from the reel. Hold a section of the tape straight with both hands and insert the tape in the tape slot making sure the dull coated side faces the rear of the recorder.

NOTE: This recorder uses Type "A" wound tape, i.e. the dull magnetic coated side faces inward on the reel. If the tape used is Type "B" (coated side facing outward) the recording will be made at a very low sound level and the playback will be almost inaudible.

3. Insert the free end of the tape into one of the three radial slots in the hub of the empty reel. Turn the reel several turns, clockwise, until the tape is secured to the reel and all slack is taken up between reels.

To Record From Microphone-

1. Turn the On-Off Tone Control clockwise until a click is heard and allow about thirty seconds for the tubes to warm up.

2. Insert the microphone plug into the "Mike" jack.

3. Depress the play-record control knob (4) as far as it will go, turn clockwise until it locks while holding it down.

4. Hold the microphone about six inches from your mouth and speak in a normal voice. Adjust the

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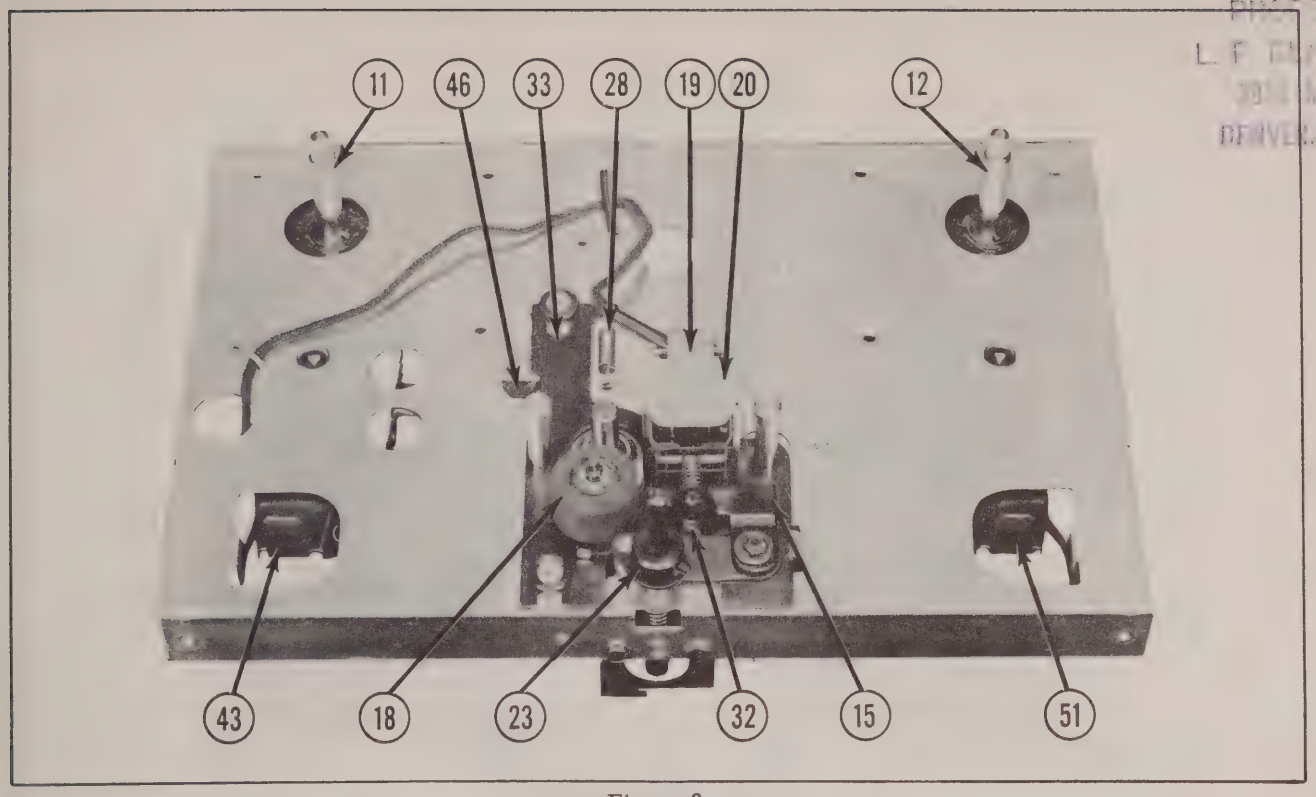

Figure 3

"Volume" control until the record level indicator flashes on the loudest sounds.

NOTE: Correct recording volume is very important. Too weak a signal, which does not cause the record level indicator to flash, will result in weak playback and high background noise. Too strong a signal, causing the level indicator to flash continuously, will result in distortion during playback.

To Record From Radio-

Recordings from a radio may be made by one of three ways:

1. Place the microphone about 6" to 12" in front of the radio speaker. Turn the radio volume control to a normal level. Setting it too high will cause distortion. Turn the radio tone control to maximum treble. Set the recording level and proceed with recording as described under "To Record From Microphone". This type of recording may not be satisfactory as other sounds may be picked up by the microphone which as a result will be recorded on the tape.

2. Have a shielded cable made up with a two conductor phone plug on one end and two alligator clips on the other end. Connect the alligator clips across the voice coil terminals on the radio speaker and insert the cord plug into the "Radio-Phono" jack. Set the radio volume and tone controls as described above. Set the recording level and proceed as described under "To Record From Microphone".

3. Have a shielded cable with a two conductor phone plug on one end and the other end connected across the radio volume control. Insert the phone plug into the "Radio-Phono" jack. Set the recording level and proceed with the recording as described under "To Record From Microphone". The position of the radio volume and tone controls has no effect on this set up and may be set anywhere.

To Record From Phonograph-

1. If the phonograph being used has a phone type plug on the pickup leads, insert it into the "Radio-Phono" jack. Set the recording level and proceed with the recording as described under "To Record From Microphone".

2. If the phonograph has a standard pin type plug which is more common, an adaptor is needed. Insert the pin plug into the adaptor and plug the adaptor into the "Radio-Phono" jack.

IMPORTANT: The recorder will not record from microphone or play back while a plug is inserted in the "Radio-Phono" jack.

To Record From Television Receiver-

1. Use one of the three methods described under "To Record From Radio" and proceed with the recording as described under "To Record From Microphone".

Dual Track Recording-

The Mitchell is designed so that only one-half the tape width is recorded at a time; thereby resulting in two track recording. This two track operation is accomplished in the following manner:

1. After a reel of tape has been recorded, i.e. all of the tape wound on to the take-up reel, turn the play-record control (4) to idle.

2. Remove the reels from the recorder, turning the full reel over and placing it on the right reel plate (7) and the empty reel on the left reel plate (2).

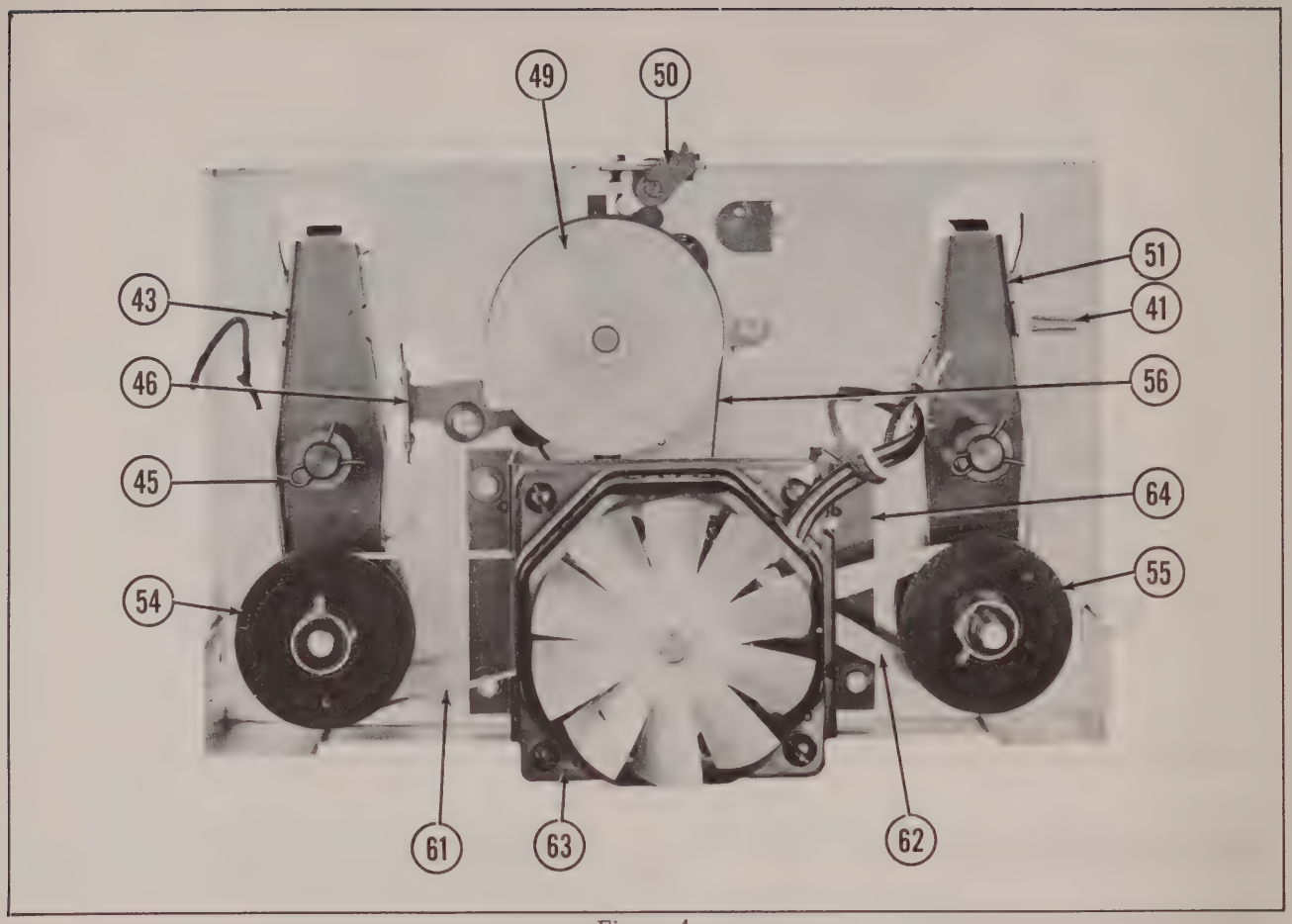

Figure 4

3. Properly thread the tape and proceed with the recording.

4. After this track has been recorded the first track of recording is ready to be played without rewinding, by reversing the reels as described in step 2 above.

Fast Forward And Fast Rewind-

High-speed forward or reverse can be obtained by pressing the desired knob (9 or 10) toward the head cover. Movement of these controls will wind the tape on the desired reel at a high speed as long as the control is held in this position. These are used primarily in locating a desired portion of a recording in a few seconds.

CAUTION: Do not attempt "Fast Forward" or "Fast Rewind" with the play-record control (4) on anything but idle position, as damage to the unit or breaking of the tape may result.

Braking-

The Mitchell is equipped with a quick stop when in high speed, either direction. Move both "Fast Forward" and "Fast Rewind" controls toward the head cover and then release both at the same time. For example: when in fast forward speed, continue to hold control and with the other hand move "Fast Rewind" control toward head cover. When machine stops, release both controls at the same time. If a coasting stop is desired, release control in motion and tape will glide to a momentum stop.

To Play A Recording-

1. Thread tape as described under "Threading the Tape".

2. Turn play-record control (4) clockwise without depressing until it locks.

3. Adjust the "Volume" and "Tone" controls for desired listening level.

To Use An External Speaker-

Any size speaker of the permanent magnet type, having a 3.2 ohm voice coil, may be used by connecting an extension cord across the voice coil of the speaker and then inserting the extension plug (same type as microphone plug) into the "Output" jack. This automatically cuts out the self-contained speaker.

To Edit And Splice Tape-

NOTE: Since it is impossible to edit and splice one track without affecting the other, recordings which are to be edited should be limited to one track only.

1. The tape may be edited by cutting out unwanted portions, or by joining selections into another sequence. Announcements may be inserted between selections, etc. Unused sections of tape can be spliced together for re-use.

2. For best results, cut tape at a slight diagonal, join ends together with splicing tape on the glossy side and trim off any excessive width.

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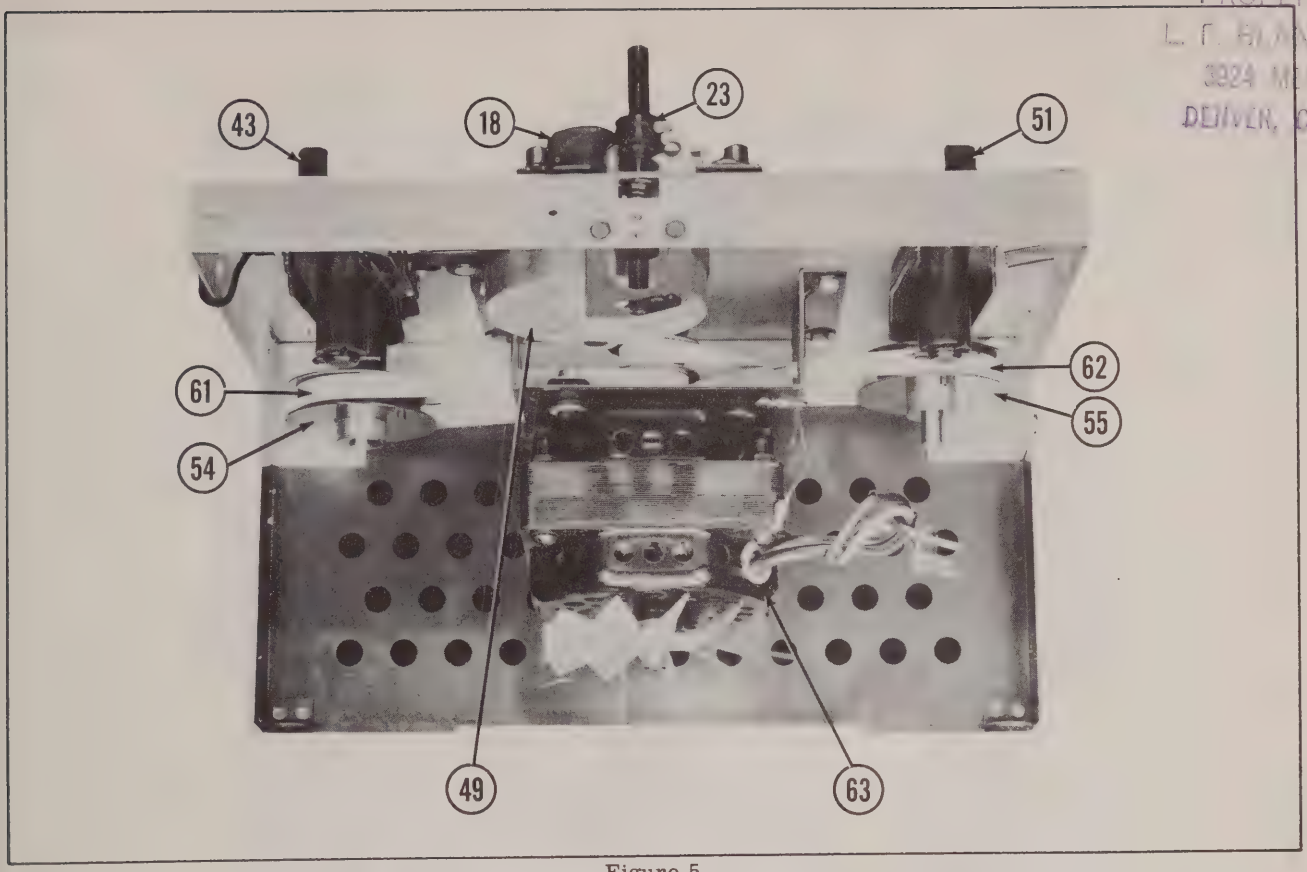


Figure 5

Erasing Recorded Material-

In the record position any recording on the tape is automatically erased before a new recording is put on the tape. If it is desired to erase a recording without putting anything on the tape follow the normal recording procedure, but leave the "Volume" control set at its extreme counterclockwise position.

To Use As A Public Address System-

1. Insert the microphone plug into the "Radio-Phono" jack.

2. Leave the play-record control (4) in idle position.

3. Speak into the microphone and adjust the "Volume" and "Tone" controls for desired level.

4. Do not have the microphone too close to the speaker or a feedback howl will result.

ADJUSTMENTS

Removing Unit From Case-

All service work except cleaning of the head and pressure roller and adjustment of the head and pressure pad assembly requires removal of the unit from the carrying case.

1. To remove unit from carrying case, disconnect power cord and remove the four Phillips head screws from bottom of case and carefully lift unit straight up and out.

Spindle (11 and 12) End Play Adjustments-

The spindles should have from 1/32" to 1/16" of up and down movement. Loosen the set screw in the pulley (54 or 55) and move the pulley up or down until the correct amount of end play is obtained.

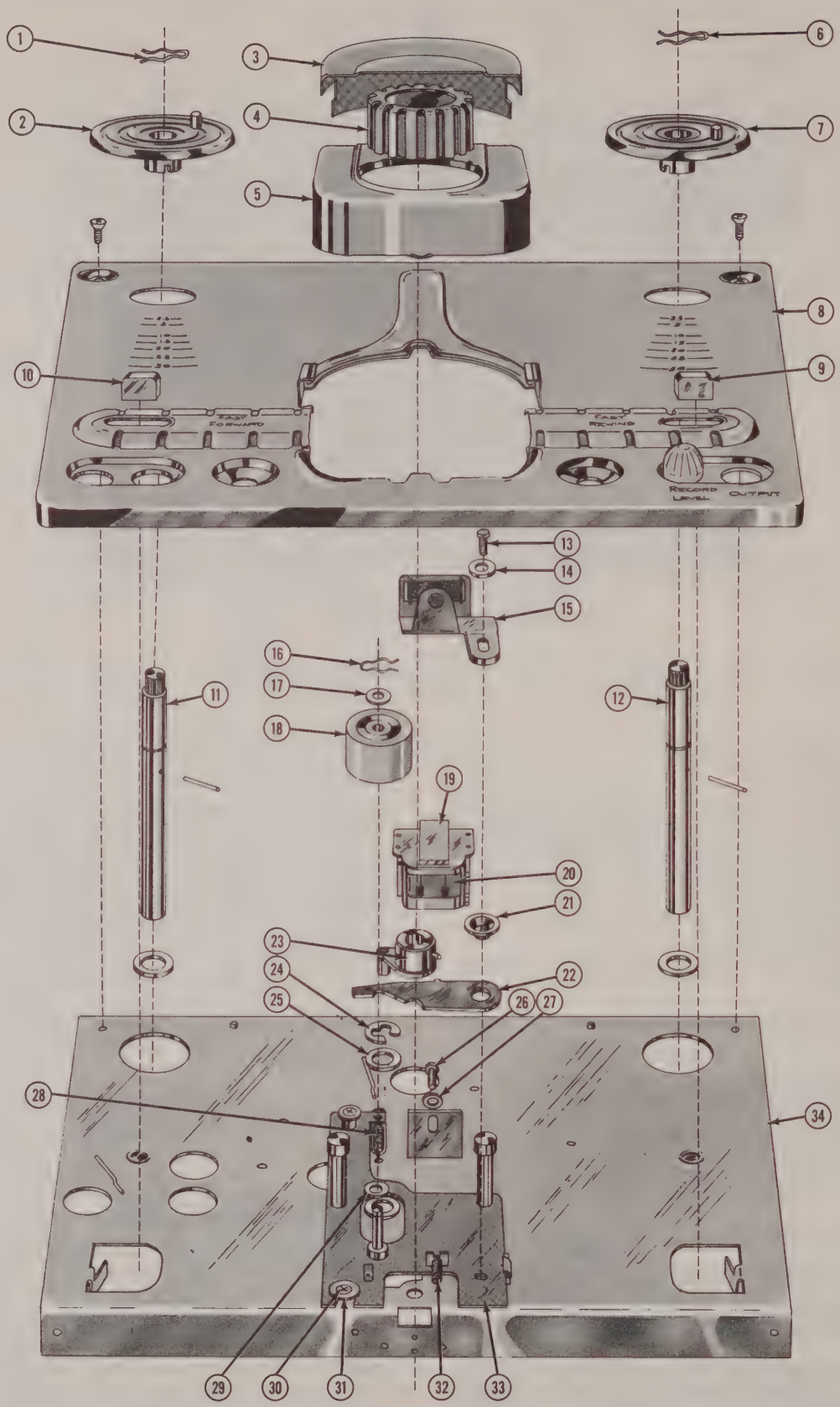
Take Up Spring (46) Adjustment-

Place a full 7" reel of tape on the take up reel plate (2). Rewind on the feed reel for about 10 seconds. Place the unit in the "Play" position. The take up reel should start revolving at the same time or a little after the capstan and pressure roller (18) start pulling tape. There should be no looping of the tape before it starts to take up. If the tape loops or doesn't take up at all, bend the take up lever spring (46) at point "A" on exploded view until the recorder takes up properly. Bending the spring outward will increase the take up while bending inward will decrease it.

CAUTION: Do not bend spring (46) to give too much take up or the tape will start to go into fast forward before the pressure roller reaches the capstan.

Take Up Reel Seat (2) And Feed Reel Seat (7) Drag Adjustment-

When the play-record control (4) is released, the reels should stop right away to prevent looping of the tape. Also when in fast forward or rewind and the control is released the reels should coast to a stop without looping the tape. The stop arms on the motorboard (point "B" on exploded view) that the take up and feed reel arms (43 and 51) rest against when the tape is not moving are what govern this. The stop arms should be bent to force the take up reel arm (43) and the feed reel arm (51) over far enough to take up enough belt tension so that the spindles just start to revolve without the reels in place. The play-record control (4) should be in its extreme counterclockwise position when making this adjustment. With the reels in place the spindles should not



A PHOTOFACT "EXPLODED" VIEW
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Figure 6A. Exploded View of Parts Above Baseplate.

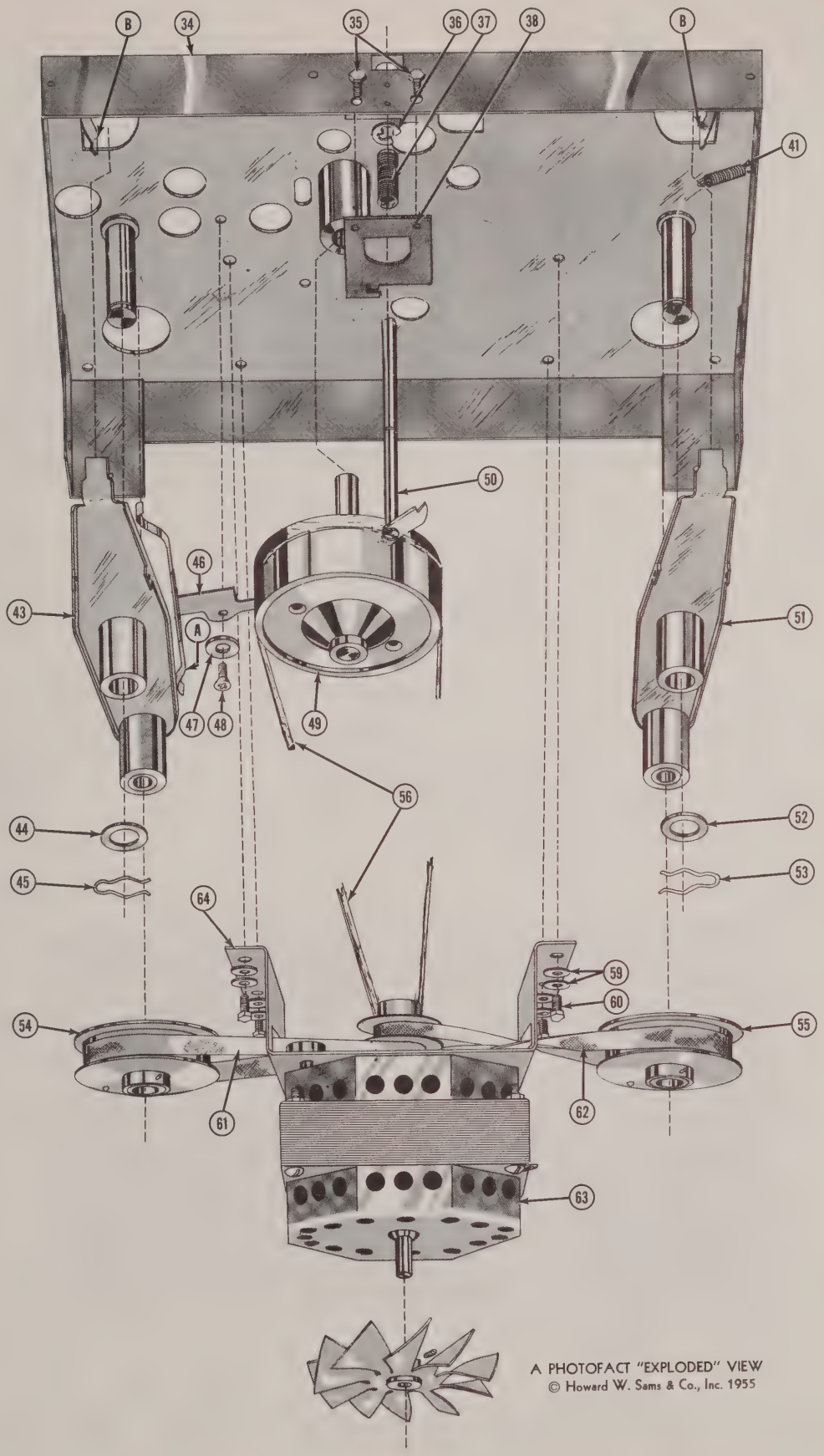


Figure 6B. Exploded View of Parts Below Baseplate.

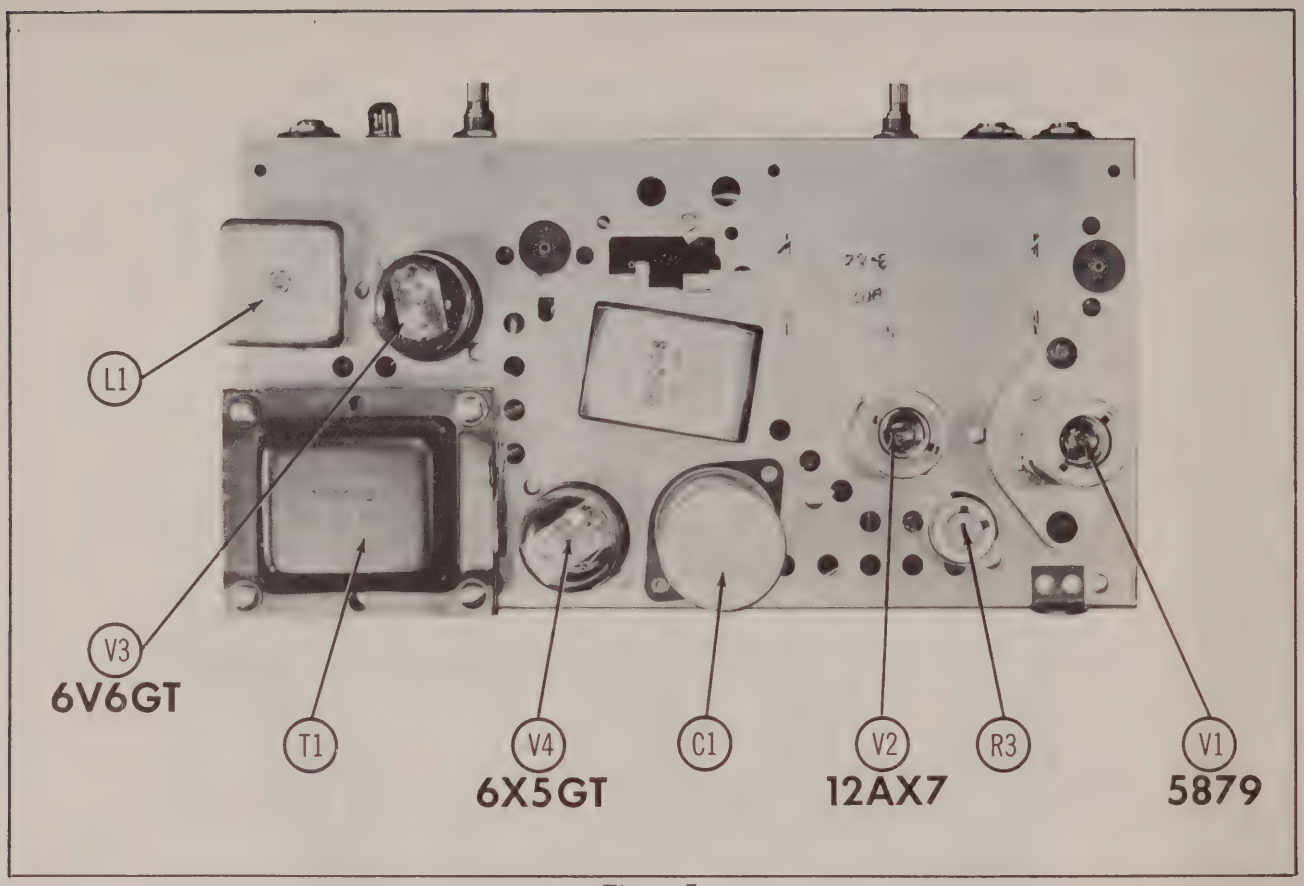


Figure 7

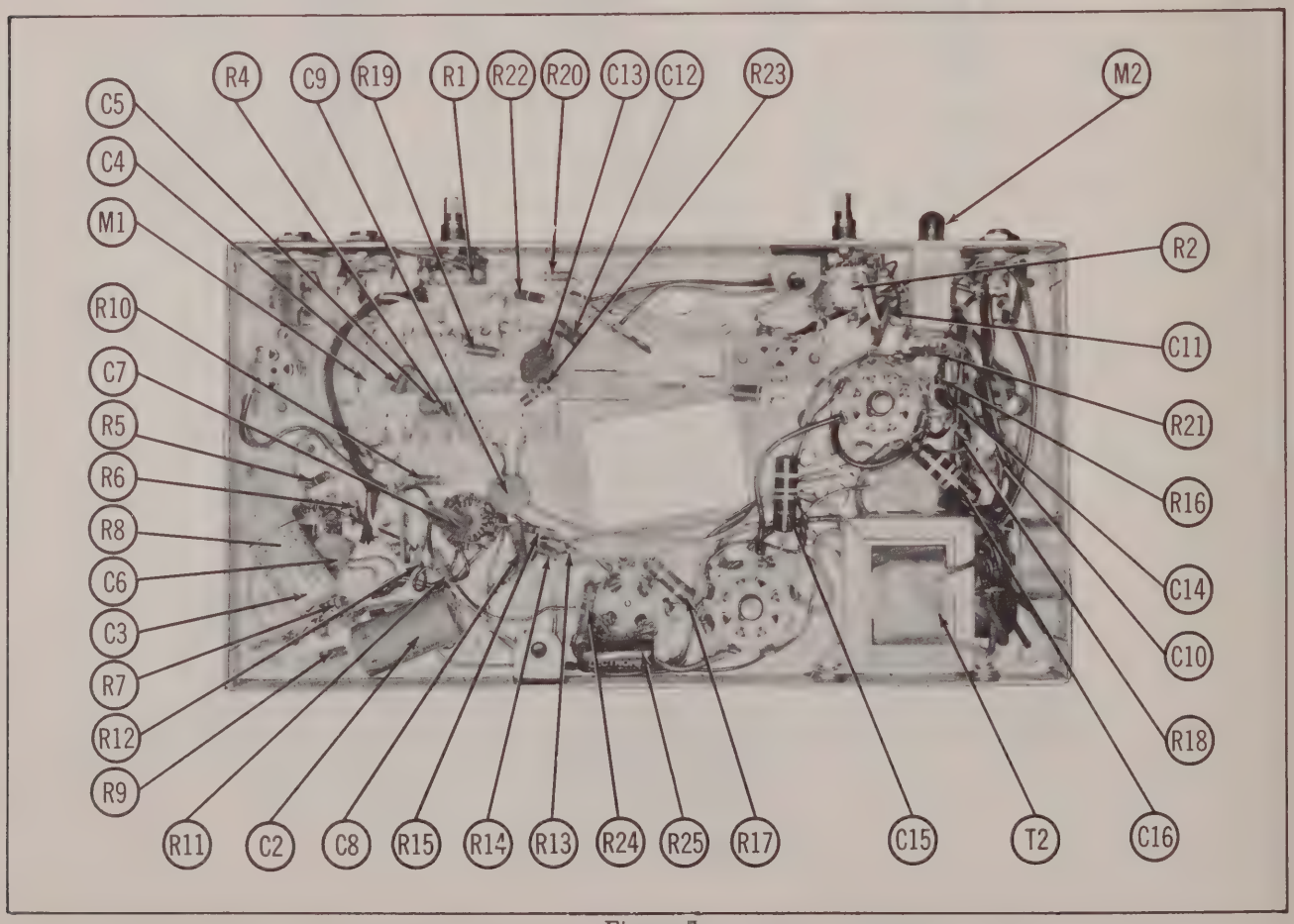
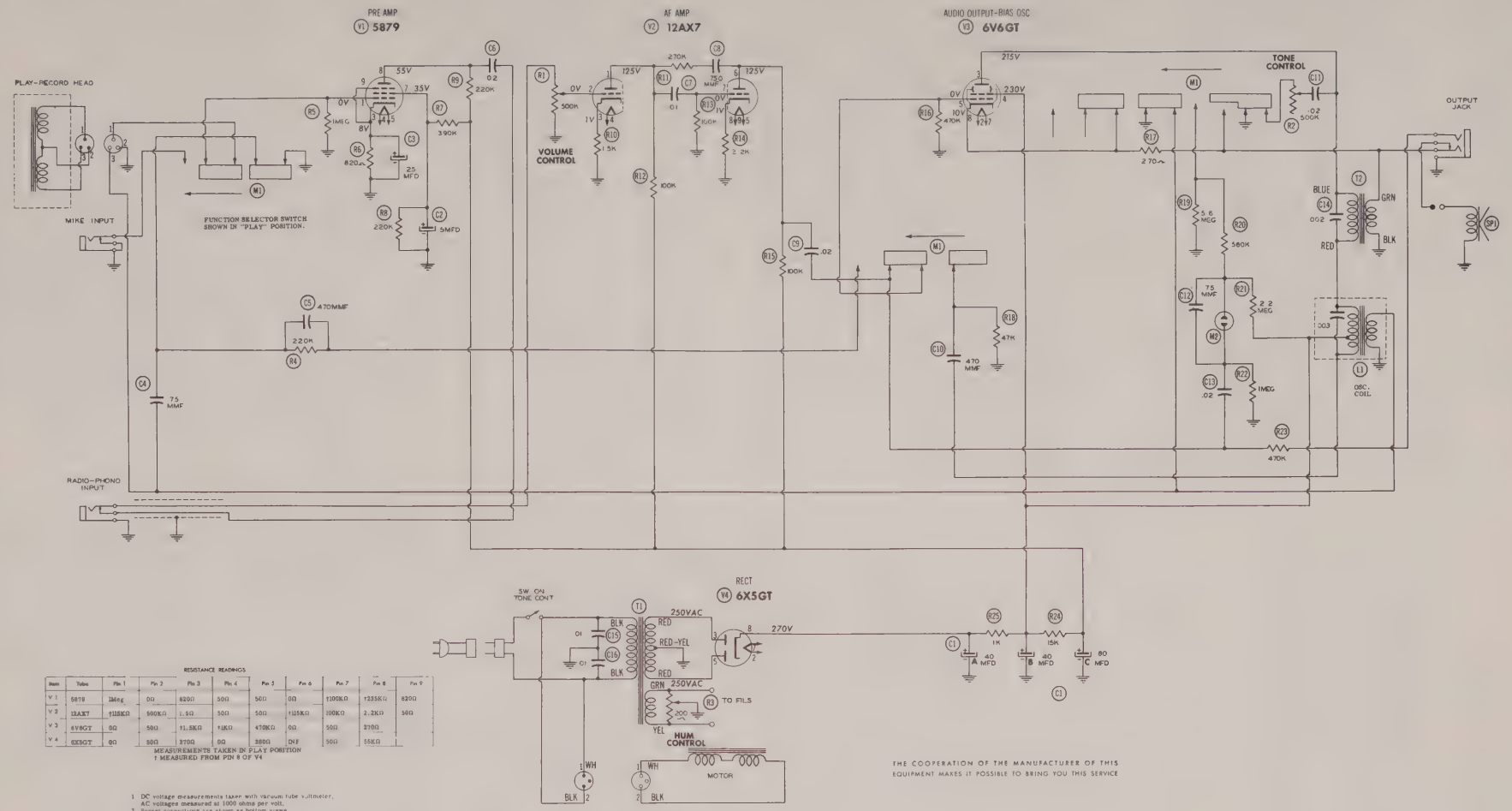


Figure 8



RESISTANCE READINGS

Item	Tubes	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	5879	1Meg	0Ω	820Ω	50Ω	50Ω	0Ω	†100KΩ	†235KΩ	820Ω
V 2	12AX7	†115KΩ	500KΩ	1.5Ω	50Ω	50Ω	†125KΩ	100KΩ	2.2KΩ	30Ω
V 3	6V6GT	0Ω	50Ω	†1.5KΩ	†1KΩ	470KΩ	0Ω	50Ω	270Ω	
V 4	6X5GT	0Ω	50Ω	370Ω	0Ω	350Ω	DNF	50Ω	55KΩ	

MEASUREMENTS TAKEN IN PLAY POSITION
† MEASURED FROM PIN 8 OF V4

1. DC voltage measurements taken with vacuum tube voltmeter. AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings
6. All controls at minimum, proper output load connected

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MITCHELL
MODEL 1290

revolve. If one or the other does, force the stop arm (point "B" on exploded view) over until it stops revolving.

Lifter Arm (23) Adjustment-

This adjusts the distance that the contact strip on the play-record switch will move when going into the record position. If an adjustment is necessary, depress and turn the play-record control (4) clockwise. Loosen the set screw in the lifter arm (23) and rotate control knob (4) to the left or right to center the contact strip with the contacts on the left end of the switch. Make sure lifter arm (23) is down as far as it will go and tighten its set screw.

Play-Record-Erase Head Adjustment-

It is very important that the head be lined up perfectly with the tape. If it is not, low output, loss of high frequencies or track overlap may result. If the head is to be replaced, the complete assembly of the head and the bracket (19) that it mounts in should be changed. The bracket is adjusted to the head and sealed in place at the factory. There are two adjustments to be made which are as follows:

1. One is the head height. This is set be placing a .179" gauge (between 11/64" and 3/16") on the motorboard (34) under where the head is mounted. The head is pushed down flush with this gauge and tightened in place and the gauge removed. If a gauge is not obtainable set the head height while the unit is pulling tape. Move the head slowly up until the top edge of the tape is hitting the edge of the tape guides on the motorboard.

2. The second adjustment is for output and frequency response. To set this make a recording of a 3000 cycle signal on a good unit. Place this on the unit that the head is to be aligned on. Connect an output meter or AC voltmeter across the speaker voice coil. Play the 3000 cycle tape, rock the head holder (19) back and forth, screw (26) holding the holder on to the motorboard bracket will allow you to do this, and notice the variation in the output voltage at the voice coil. Tighten the head holder in the position of highest output. Make sure the head was not moved up or down while rocking it. If a 3000 cycle signal tape cannot be made, record a record with some high notes on it on another unit. Play this back on the unit to be adjusted and rock the head to give best high note response.

After setting the height and output check unit for track overlap. To do this take a reel of tape that has no recording on it. Make a recording on the unit that the head has been adjusted on. Do not rewind but take the reels off, reverse them and play the other track. There should be no sound heard. If what was recorded is heard backwards then there is track overlap. If this is the case, the guide on the head holder should be bent up to move the tracks further apart.

Pressure Pad Adjustment-

This applies the correct pressure between the tape and the head. To adjust this, loosen screw (13) that holds pressure pad bracket (15). Turn play-record control (4) clockwise. Move bracket (15) forward until the pressure pad moves back against its spring 1/16". Make sure the front edge of the bracket is parallel with the head and tighten screw (13).

NOTE: When ordering a replacement head, be sure to get the complete assembly of head, plug and bracket. The bracket is adjusted to the individual head and sealed at the factory. Also, when ordering a replacement motor, be sure to get the complete assembly of motor, pulley and plug. The pulley is turned down on the individual motor and is not interchangeable.

Hum Balance Adjustment-

If tube V1 or V2 is replaced or the head changed the setting of the hum balance pot. (R3) should be checked. To do this, connect an external speaker to the unit as described under "To Use An External Speaker". Connect an AC voltmeter with a .1 volt AC scale across the speaker voice coil. Turn the "Volume" and "Tone" controls clockwise. Place the play-record control (4) in "Play" position. Put the AC meter on the .1 volt scale and adjust the hum pot. (R3), which is located between tubes V1 and V2 on top of the chassis, to its minimum reading. It should not exceed .1 volt. This is the only adjustment required in the amplifier.

LUBRICATION

The lubricants applied at time of manufacture should be sufficient for a long period of time. Approximately once a year, or in the event that parts are replaced, lubricate the unit as follows:

With No. 20 Motor Oil-

1. Take up reel arm (43) bushing.
2. Feed reel arm (51) bushing.
3. Spindle (11 and 12) bearings.
4. Flywheel (49) bearings.
5. Pressure roller (18) bearing.

With Staput No. 312 grease or lubriplate-

1. Pressure plate (33) at the slide buttons and the guide on the right side.
2. On the stud of the lifter arm (23).

CAUTION: Do not oil the motor bearings unless absolutely necessary as excess oil will only be thrown off and cause slipping of the pulleys and rollers. Always use as little oil as possible. If oil should get on the pulleys and rollers wipe off with a petroleum solvent, such as alcohol. Do not use carbon tetrachloride.

TROUBLES

Won't Take Up Tape Properly-

1. Spindle (11) binding.
   (a) Lubricate.
2. Improper take up spring (46) adjustment.
   (a) See "Take Up Spring Adjustment".
3. Belt (61) slipping.
   (a) Clean motor pulley and pulley (54).
4. Belt (61) broken.
   (a) Remove bracket (64) and replace belt.
5. Set screw loose in pulley (54).
   (a) Tighten and leave 1/32" to 1/16" end play in spindle.
6. Pulley (54) broken.
   (a) Replace pulley.

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Fast Forward Won't Function Properly-

1. See above except for step 2.

Fast Rewind Won't Function Properly-

1. Spindle (11 or 12) binding.
   (a) Lubricate.
2. Belt (62) slipping.
   (a) Clean motor pulley and pulley (55).
3. Belt (62) broken.
   (a) Remove bracket (64) and replace belt.
4. Set screw loose in pulley (55).
   (a) Tighten and leave 1/32" to 1/16" end play in spindle.
5. Pulley (55) broken.
   (a) Replace pulley.

Speed Variation or Wow-

1. Slippage.
   (a) Clean motor pulley, flywheel and capstan (49) and pressure roller (18) with a petroleum solvent, not carbon tetrachloride. Replace rubber rollers if they appear oil soaked.
2. Too much feed reel drag.
   (a) Check adjustment as described under "Take Up Reel Seat And Feed Reel Seat Drag Adjustment".
3. Flat spot on rubber roller (18).
   (a) A rapid thumping sound while the unit is running may indicate a flat spot on the rubber tire. If this condition does not clear up after several minutes of running time, replace the roller.
   (b) If the surface of the rubber roller is not smooth and even, replace the part.
   (c) Should the bearings of the rollers show signs of excessive wear or be extremely wobbly, the rollers should be replaced.
4. Tight feed or take up spindle (11 or 12)
   (a) Check adjustment as described under "Spindle End Play Adjustment".
   (b) Lubricate.
5. Tight pressure roller (18).
   (a) Lubricate.
6. Tight flywheel shaft (49).
   (a) Lubricate.
7. Pressure pad assembly (15) applying too much pressure against tape.
   (a) Check adjustment as described under "Pressure Pad Adjustment".

CLEANING

The record-playback head (20), capstan shaft and pressure roller (18) are subject to an accumulation of tape coating residue, which is worn off the tape as it passes these parts. This can cause distortion, weak output and poor erasure. Use a soft cloth and alcohol to clean the head surfaces, capstan and pressure roller.

CAUTION: Do not use a brush or any metallic object when cleaning the record-playback head as this could possibly mar the head surface.

ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
V1		5879, Pre-Amp.	R5		Resistor, 1 Meg., 1/2 Watt
V2		12AX7, AF Amp.	R6		Resistor, 820Ω, 1/2 Watt
V3		6V6GT, Audio Output-Bias Osc.	R7		Resistor, 390KΩ, 1/2 Watt
V4		6X5GT, Recitifer	R8		Resistor, 220KΩ, 1/2 Watt
C1A		Elect. Cap., 40mfd. @ 300V.	R9		Resistor, 220KΩ, 1/2 Watt
C1B		Elect. Cap., 40mfd. @ 300V.	R10		Resistor, 1.5Ω, 1/2 Watt
C1C		Elect. Cap., 80mfd. @ 300V.	R11		Resistor, 270KΩ, 1/2 Watt
C2		Elect. Cap., 5mfd. @ 150V.	R12		Resistor, 100KΩ, 1/2 Watt
C3		Elect. Cap., 25mfd. @ 25V.	R13		Resistor, 100KΩ, 1/2 Watt
C4		Cap. Ceramic Tub., 75mmf. ± 10%	R14		Resistor, 2.2KΩ, 1/2 Watt
C5		Cap. Ceramic Tub., 470mmf. ± 10%	R15		Resistor, 100KΩ, 1/2 Watt
C6		Cap. Ceramic, .02mfd. @ 500V.	R16		Resistor, 470KΩ, 1/2 Watt
C7		Cap. Ceramic, .01mfd. @ 500V.	R17		Resistor, 270Ω, 1 Watt
C8		Cap. Ceramic Tub., 750mmf. ± 10%	R18		Resistor, 47KΩ, 1/2 Watt
C9		Cap. Ceramic, .02mfd. @ 500V.	R19		Resistor, 4.6 Meg., 1/2 Watt
C10		Cap. Ceramic Tub., 470mmf. ± 10%	R20		Resistor, 560KΩ, 1/2 Watt
C11		Cap. Ceramic, .02mfd. @ 500V.	R21		Resistor, 2.2 Meg., 1/2 Watt
C12		Cap. Ceramic Tub., 75mmf. ± 10%	R22		Resistor, 1 Meg., 1/2 Watt
C13		Cap. Ceramic, .02mfd. @ 500V.	R23		Resistor, 470KΩ, 1/2 Watt
C14		Cap. Ceramic, .002mfd. @ 500V.	R24		Resistor, 15KΩ, 1/2 Watt
C15		Cap. Molded Paper, .01mfd. @ 400V.	R25		Resistor, 1K, 5 Watt, W.W.
C16		Cap. Molded Paper, .01mfd. @ 400V.	T1		Power Transformer
R1		Volume Cont., 500K	T2		Output Transformer
R2		Tone Cont. & Switch, 500K	L1		Osc. Coil
R3		Hum Balance Cont., 200Ω W.W.	M1		Play-Record Switch
R4		Resistor, 220KΩ, 1/2 Watt	M2		Record Level Lamp, Neon, Type NE51

MECHANICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1		Spring Retainer	30		Phillips Flat Hd. M.S., 6-32 x 1/4
2		Reel Plate	31		Slide Button
3		Head Cover	32		Tension Arm Spring
4		Mechanism Control Knob	33		Pressure Plate & Stud Assembly
5		Cover	34		Motorboard Staking Assembly & Riveting
6		Spring Retainer			
7		Reel Plate	35		Hex. Hd. M.S., 6-32 x 1/4
8		Top Panel	36		Control Shaft Retainer
9		Rewind Control Knob	37		Record Release Spring
10		Fast Forward Control Knob	38		Position & Shaft Bracket
11		Spindle Assembly	41		Spindle Arm Spring
12		Spindle Assembly	43		Take Up Reel Arm Assembly
13		Screw, 6-32 x 5/16 Hex. Hd.	44		Fibre Washer
14		Flat Washer, .142 x 5/16 x 1/32	45		Hair Pin Clip
15		Pressure Pad Bracket Assembly	46		Take Up Lever & Spring Assembly
		Pressure Pad Assembly	47		Slide Button
		Pressure Pad Spring	48		Phillips Flat Hd. M.S., 6-32 x 1/4
16		Spring Retainer	49		Flywheel & Capstan Shaft Assembly
17		Cloth Washer	50		Control Shaft & Lever Assembly
18		Pressure Roller	51		Feed Reel Arm Assembly
19		Head Holder	52		Fibre Washer
20		Play-Record-Erase Head and Plug Assembly	53		Hair Pin Clip
			54		Pulley & Set Screw Assembly
21		Slide Button	55		Pulley & Set Screw Assembly
22		Tension Arm	56		Capstan Drive Belt
23		Lifter Arm & Set Screw Assembly	59		Flat Washer, .188 x 7/16 x .032
24		Flywheel Retainer	60		Hex. Hd. M.S., 8-32 x 1/4
25		Flat Washer, .315 x .01	61		Take Up Reel Drive Belt
26		Screw, 8-32 x 5/16 Hex. Hd.	62		Feed Reel Drive Belt
27		Flat Washer, .188 x 7/16 x .032	63		Motor, Pulley & Plug Assembly
28		Pressure Plate Return Spring	64		Shock Mount & Bracket Assembly
29		Cloth Washer			

PROPERTY OF
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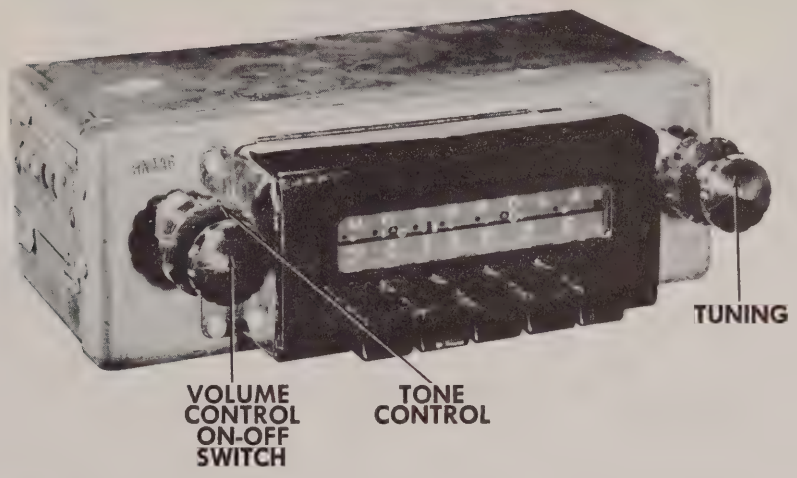
DENVER, COLORADO

MOTOROLA MODELS BK53A6, GMT53A6, HN4A6, SR52A6 (Ch. R17A6, P6-2, P8-2)



TRADE NAME	Motorola	Chassis R17A6 Tuner, P6-2 (Single-Ended Audio & Power Ch.), P8-2 (Push-Pull Audio & Power Chassis) Used In Following Models: BK53A6 (1949 thru 1953 Buick Special & 1942, 1946 thru 1952 Buick Super & Roadmaster) GMT53A6 (1948 thru 1953 Chevrolet & GM Trucks) HN4A6 (1954 Hudson) SR52A6 (1950 thru 1952 Studebaker)
MANUFACTURER	Motorola, Inc., 4545 Augusta Blvd., Chicago, Illinois	
TYPE SET	Battery Operated Automobile Superheterodyne Receiver for custom installation.	
TUBES	Chassis R17A6: 6BD6 RF Amp., 6BE6 Conv., 6BD6 IF Amp., 6CR6 Det-AVC-AF Amp. Chassis P6-2: 6AQ5 Output, 6X4 Rectifier Chassis P8-2: (2) 6AQ5 Output, 6X4 Rectifier	
POWER SUPPLY	6 Volts Storage Battery	
TUNING RANGE	535-1605KC	

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use alignment tool, Motorola Part No. 66A76278 (or equivalent) for adjustment of tuner cores.
Remove top and bottom covers for alignment adjustments.
Remove escutcheon and dial scale bracket assembly for tuner core adjustments.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Allow approximately a 5 minute warm-up period.
Set Tone control to "High" position.
Attenuate signal generator output so as to maintain approximately 1.79 volts on output meter after alignment of each stage.
Use care when adjusting tuning cores, as excessive pressure may move tuner carriage and result in inaccurate alignment.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1MFD	High side to pin 7 (grid) of 6BE6 (V2). Low side to chassis.	455KC (400~ Mod.)	Extreme high frequency end of dial. (cores out)	Across voice coil.	A1, A2 A3, A4	Adjust for maximum output.
2	See Fig. 1	High side to antenna receptacle. Low side to chassis.	1605KC	"	"	A5, A6 A7	Preset A8, A9, A10 so that 1 5/16" of core projects from end of coil. Adjust A5, A6 and A7 for maximum output.
3	"	"	1300KC	Using knob, turn tuning shaft to right until carriage stops. Turn shaft left to back carriage off 5/16".	"	A8, A9 A10	Adjust for maximum output. Repeat steps 2 & 3. Cement core adjustment in place.
4	"	"	"	Tune to 1300KC signal.			If necessary, bend dial pointer to coincide with 1300KC reference mark on dial.
5	With radio installed in car and antenna fully extended, tune to weak station near 1400KC and adjust A7 for maximum volume.						

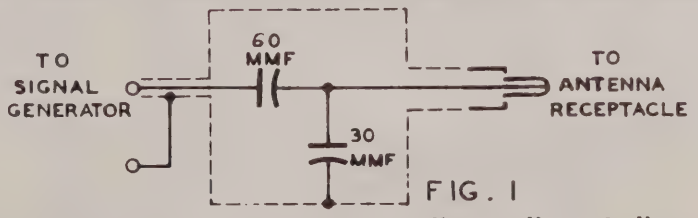


FIG. 1

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"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
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TUNER PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		MOTOROLA PART No.	STANDARD REPLACEMENT		
V1	RF Amp.	6BD6	6BD6	7BK	
V2	Converter	6BE6	6BE6	7CH	
V3	IF Amp.	6BD6	6BD6	7BK	
V4	Det-AVC-AF Amp.	6CR6	6CR6	7EA	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1	90		21A591682							
C3	.006	400	8R121001	P488-006	D6-602	CUB6D6	GP2-333-502	PT626	6TM-D6	
C3	680	500	21R118317	1468-681	D6-681	5W5T68	GP2K-681	UC-5368	1FM-37	
C4	1		21R115957	811NP0	TCZ-1	TZ03	NP0A-010		5TCCB-V1	
C5	47		21R115890	BPD-470	D6-470	G033	831-470	UC-5447	5GA-Q47	
C6	220		21R115986							
C7	.05	400	8R121567	P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C8	.05	100	8R121005	P288-05	DF-503	CUB2S5		PT415	2TM-S5	
C9	.01	100	8R121002	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C10	.1	200	8R121573	P288-1	DF-104	CUB2P1		PT401	2TM-P1	
C11	.002	400	8R121568	P688-002	D6-202	CUB6D2	GP2-333-202	PT622	6TM-D2	
C12	.02	400	8R121566	P488-02	DF-203	CUB4S2	817-02	PT412	4TM-S2	
C13	470		21R114554	BPD-471	D6-471	K060	811-471	UC-5347	5GA-T47	
C14	.5	100	8K17028	P185-5		MP2P5		RF480	68P20	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MOTOROLA PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	1Meg	½	18K531789			F1-55	UF16L	Tone - Panel - Note 1
B	250KΩ	½				R2-38	UR254-T753	Volume tapped at 30KΩ-rear
C	Switch					KB-1	US-26	Attach to R1B

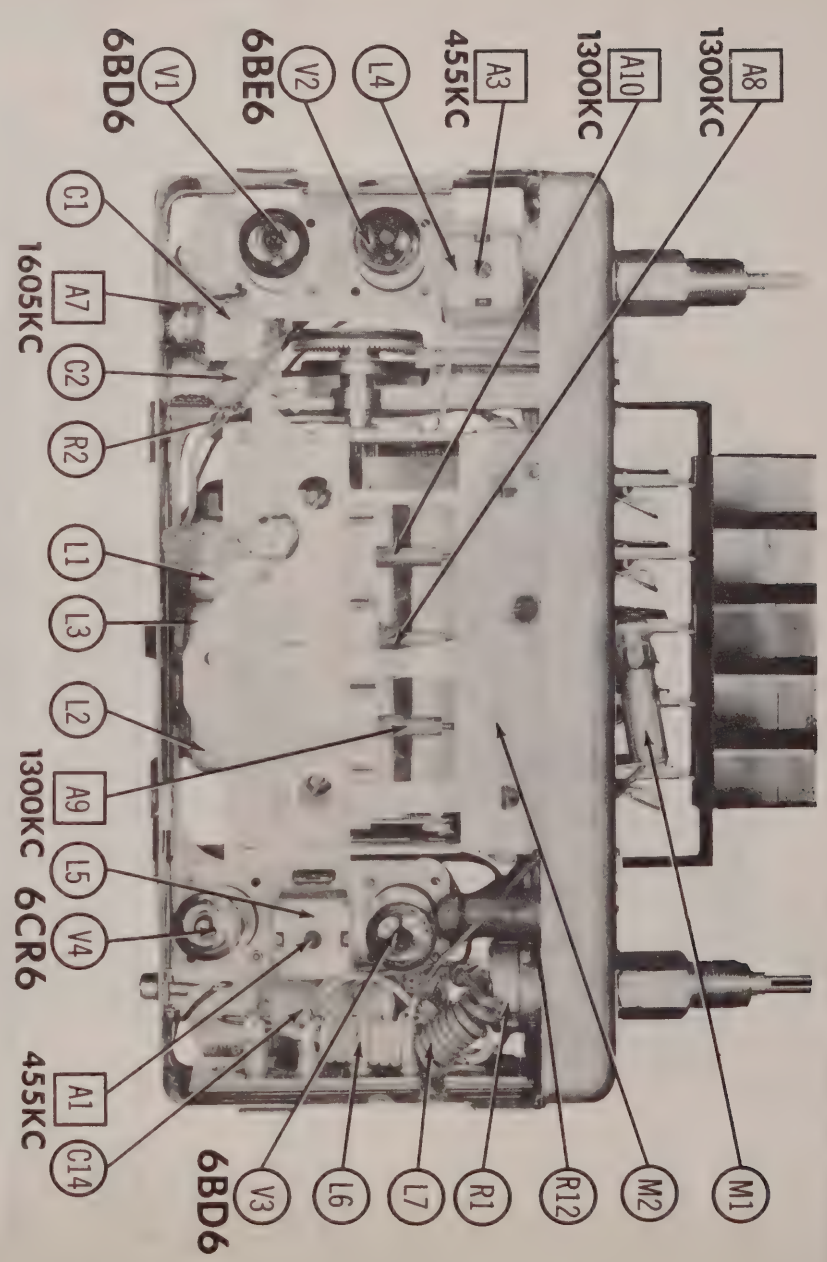
Note 1: Models GMT53A6, & BK53A6 use control part no. 18K531787 and model SR52A6 uses control part no. 18K531788.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R2	470KΩ	½	6R6032	BTS-470K	
R3	1000Ω	½	6R6229	BTS-1000	
R4	18KΩ	½	6R5591	BTS-18K	
R5	33KΩ	½	6R6012	BTS-33K	
R6	560Ω	½	6R6291	BTS-560	
R7	6800Ω	2	6R5690	BTB-6800	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R8	1Meg	½	6R6004	BTS-1Meg	
R9	47KΩ	½	6R6056	BTS-47K	
R10	2.2Meg	½	6R3927	BTS-2.2Meg	
R11	1Meg	½	6R2119	BTS-1Meg	
R12	15KΩ	½	6R6004	BTS-15K	
R13	220KΩ	½	6R6015	BTS-220K	

CHASSIS—TOP VIEW



TUNER PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	MOTOROLA PART No.	JENSEN PART No.	QUAM PART No.	
SPLA	6X9"	PM	3T04Ω	50K513194 50K513196 50K513198 50K513201 ① 50K513545 50K532562	ST-810 Mod. P69-V	69A2	① Used in model HN4A6. ② Used in models GMT53A6, SR52A6, and BK53A6.
B	6X9"	PM	3T04Ω	50C513193 50C513195 50C513197 ② 50C513200 50C513544 50C532561	ST-810 Mod. P69-V	69A2	

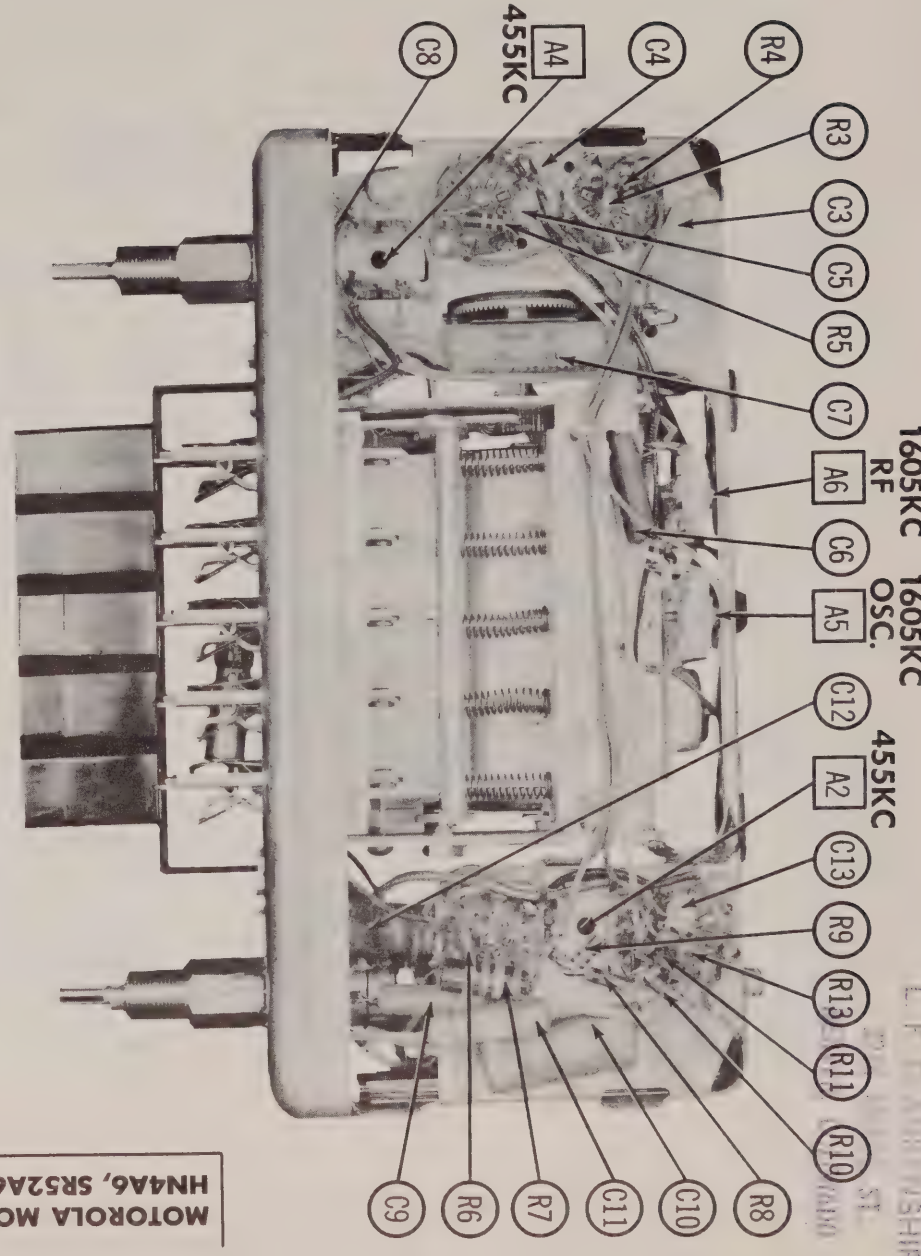
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	1Ω		24B520694				
L2	RF Coil	1Ω		24K520695				
L3	Osc. Coil	.9Ω	4.3Ω	24B520693				
L4	Input IF	18Ω	18Ω	24C485553	16-6758	BC-352	12-C1	
L5	Output IF	17Ω	17Ω	24C485555	16-6770	BC-355	12-C6	
L6	Fil. Choke	0Ω		24K592269			5221	1Microhenry
L7	Fil. Choke	0Ω		24K592269			5221	1Microhenry

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M1	Dial Light	65X10867	#44, Bayonet
M2	Tuner	51D512128	Pushbutton
	Spark Plate	1V531895	
A5	Trimmer cap.	20A77537	Osc. Trimmer (5-80MMF.)
A6	Trimmer cap.	20A77537	RF Trimmer (5-80MMF)
A7	Trimmer cap.	20A513232	Ant. Trimmer (20-180MMF)
	Knob	1V513035	On-Off-Volume - Models HN4A6, SR52A6
	Knob	1V513438	On-Off-Volume - Model GMT53A6
	Knob	1V520078	On-Off-Volume - Model BK53A6
	Knob	35B513220	Tone - Model HN4A6
	Knob	35K512160	Tone - Models SR52A6, GMT53A6, BK53A6
	Knob	35K513223	Disc-Dummy-Tuning shaft - Model HN4A6
	Knob	36K473550	Disc-Dummy-Tuning shaft - Models BK53A6, GMT53A6 SR52A6
	Pointer & Sleeve Assembly	1V512211	Models HN4A6, SR52A6
	Pointer & Sleeve Assembly	1V520528	Model BK53A6
	Pointer & Sleeve Assembly	1V513435	Model GMT53A6
	Push Button	1V513437	5 Used - Model GMT53A6
	Push Button	1V520529	5 Used - Model BK53A6
	Push Button	1V513034	5 Used - Models HN4A6, SR52A6
	Dial Scale	34B512735	Model GMT53A6
	Dial Scale	34B520516	Model BK53A6
	Dial Scale	34B512992	Model SR52A6
	Dial Scale	34B530359	Model HN4A6

CHASSIS—BOTTOM VIEW



MOTOROLA MODELS BK53A6, GMT53A6, HN4A6, SR52A6 (Ch. R17A6, P6-2, P8-2)

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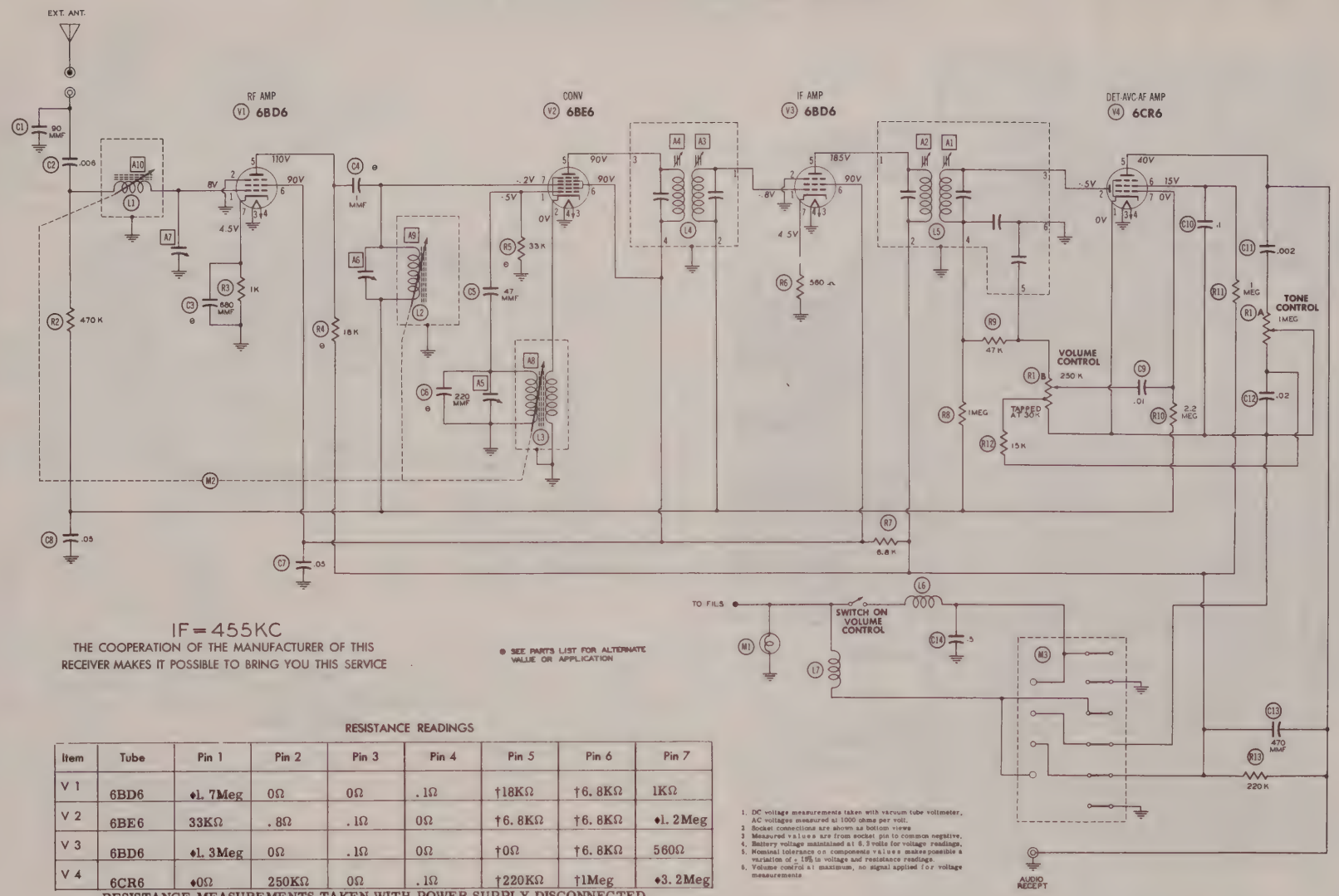

IF = 455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	6BD6	♦1. 7Meg	0Ω	0Ω	. 1Ω	†18KΩ	†6. 8KΩ	1KΩ
V 2	6BE6	33KΩ	. 8Ω	. 1Ω	0Ω	†6. 8KΩ	†6. 8KΩ	♦1. 2Meg
V 3	6BD6	♦1. 3Meg	0Ω	. 1Ω	0Ω	†0Ω	†6. 8KΩ	560Ω
V 4	6CR6	♦0Ω	250KΩ	0Ω	. 1Ω	†220KΩ	†1Meg	♦3. 2Meg

RESISTANCE MEASUREMENTS TAKEN WITH POWER SUPPLY DISCONNECTED
† MEASURED FROM B+ TERMINAL
♦ MEASURED FROM PIN 1 OF V4. (COMMON NEGATIVE)

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 6.3 volts for voltage readings.
5. Nominal tolerance on components values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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TUNER R17A6 SCHEMATIC

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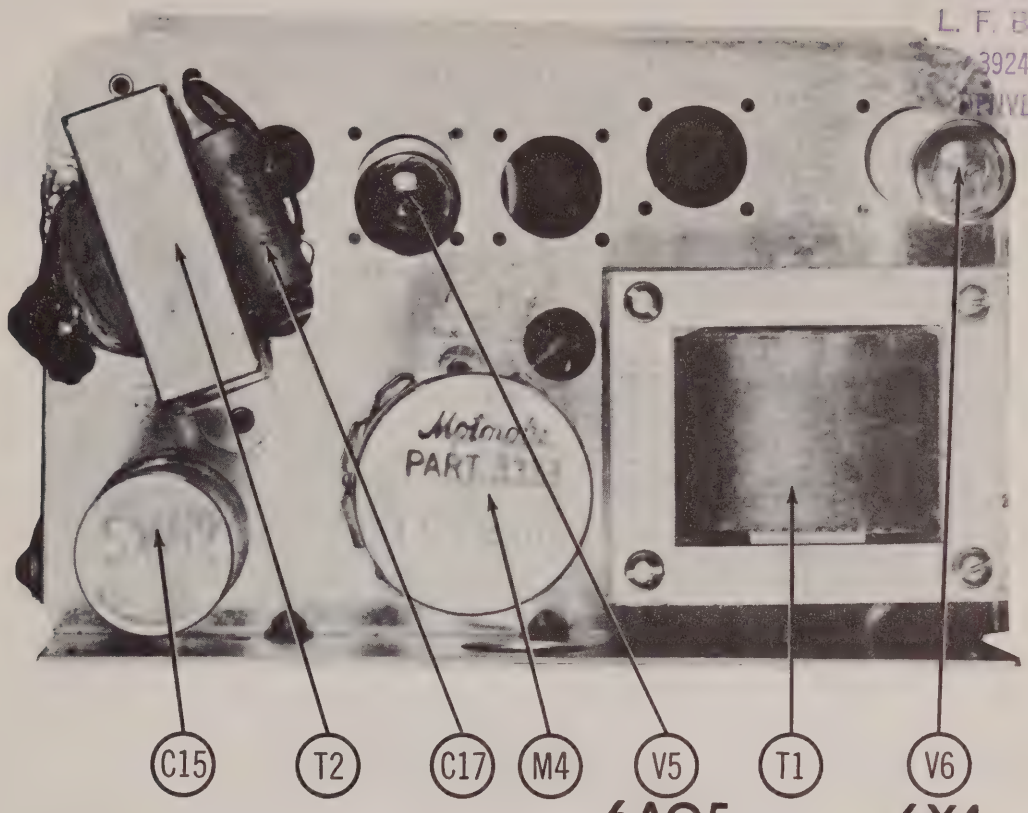
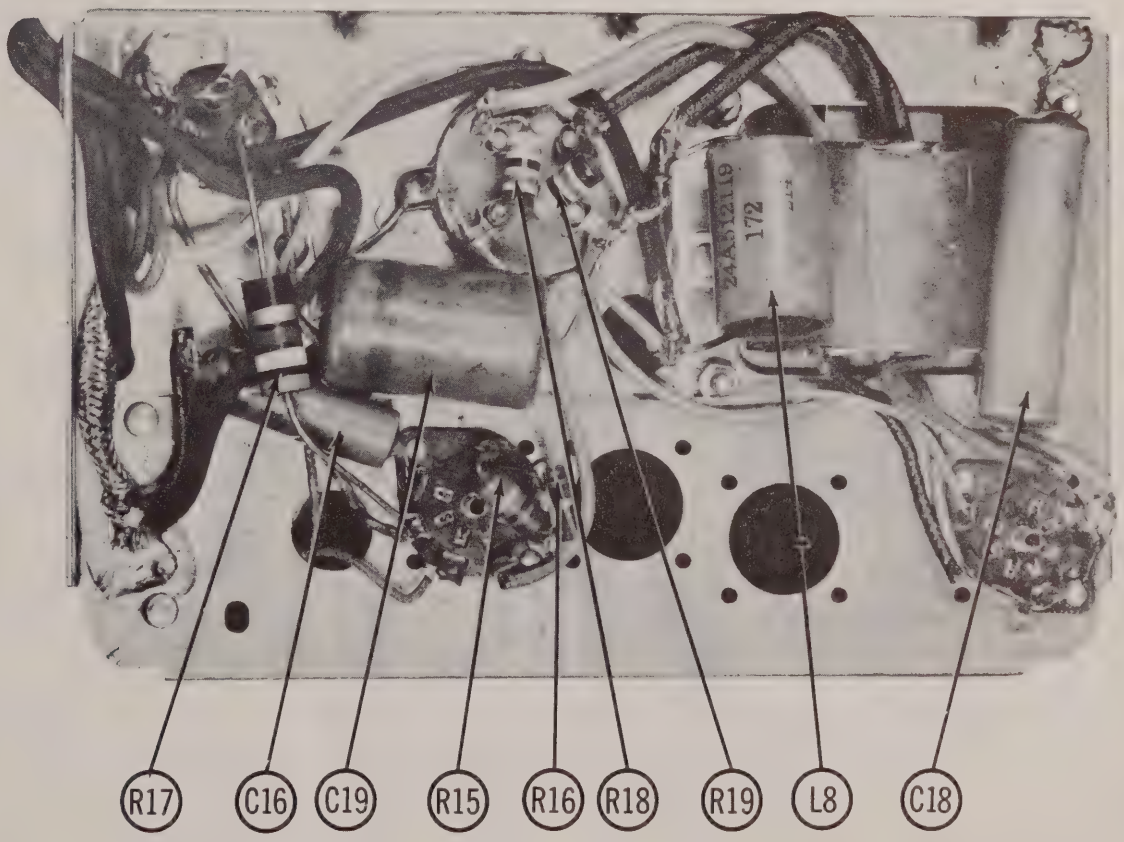


CHASSIS P6-2-TOP VIEW



CHASSIS P6-2-BOTTOM VIEW

CH. P6-2 PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V5	Audio Output	6AQ5	6AQ5	7BZ	
V6	Rectifier	6X4	6X4	5BS	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C15A	■30	350	23A473015	AFH3-169		C131		FP331	TVL-3620	
B	▲30	300								
C	20	25								
C16	.02	400	8R12699	P488-02	DF-203	PTE4S2		PT412	4TM-S2	
C17	.006	400	8K71910	P688-006	D6-602	PTE6D6	GP2-333-602	PT626	6TM-D6	
C18	.02	1000	8K14137	P1088-02		PTE16S2		PT1612	MB-S2	
C19	.5	100	8K17028	P185-5		MP2P5		RF480	68P20	

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	MOTOROLA PART No.	IRC PART No.	NOTES
R15	220KΩ	½	6R6015	BTS-220K	
R16	270Ω	½	6R6432	BTS-270	
R17	3900Ω	2	6R476012	BTB-3900	

ITEM No.	RATING: OHMS	RATING: WATT	MOTOROLA PART No.	IRC PART No.	NOTES
R18	56Ω	½	6R5614		
R19	56Ω	½	6R5614		

TRANSFORMER (VIBRATOR)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	MOTOROLA PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	6.3VCT ②5.4A	464VCT .043ADC			25K512083		P-3068 ①	TV-16K ①	V3803 ①	T-22R27①

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	MOTOROLA PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T2	7.3KΩ	3.2Ω	25B502330	A-3878 ①	A-2931 ①	S-7X	Z1113	26S48 ①	① Drill one new mounting hole.

COILS (RF-IF)

ITEM No.	USE	DC RES.: PRI.	DC RES.: SEC.	MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L8	Vib. Hash Choke	0Ω		24A512119				47 Microhenries

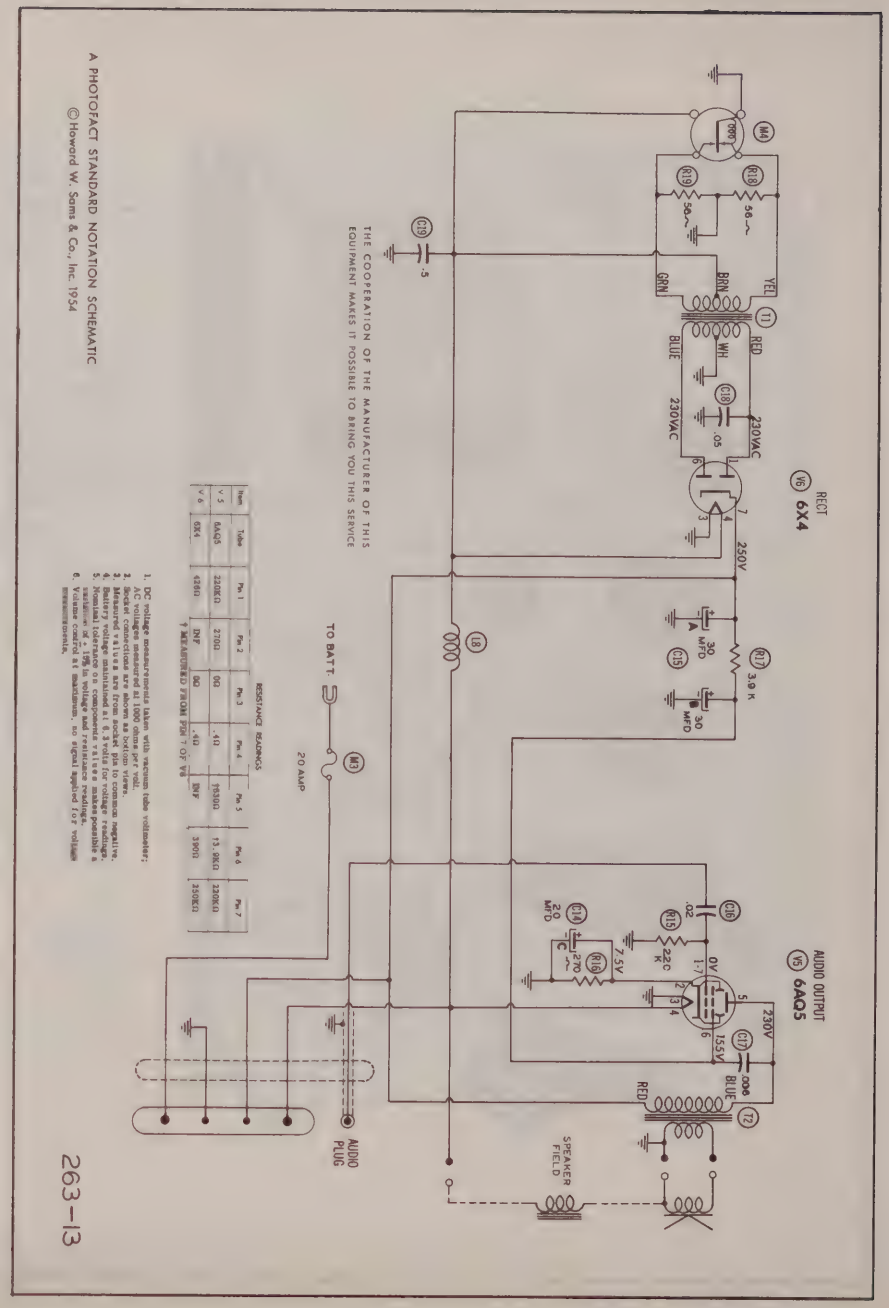
FUSES

ITEM No.	TYPE	RATING	MOTOROLA PART No.: FUSE	MOTOROLA PART No.: HOLDER	LITTELFUSE PART No.: FUSE	LITTELFUSE PART No.: HOLDER	BUSS PART No.: FUSE	BUSS PART No.: HOLDER
M3	SFE	20A	65K4637	9K592646	307020	157020	SFE-20	HDJ-A

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	MOTOROLA PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	NOTES
M4	Int.	6.3V	115∿	48B3333	5342	859	5342	

CH. P6-2



CH. P8-2 PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V7	Phase Inverter	6AT6	6AT6	7BT	
V8	Audio Output	6AQ5	6AQ5	7BZ	
V9	Audio Output	6AQ5	6AQ5	7BZ	
V10	Rectifier	6X4	6X4	5BS	

CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT	MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C20A	■30	350	23A473015	AFH3-169		C131		FP331	TVL-3620	
B	▲30	300								
C	20	25								
C21	.02	400	8R12699	P488-02	DF-203	PTE4S2		PT412	4TM-S2	
C22	.02	400	8R12699	P488-02	DF-203	PTE4S2		PT412	4TM-S2	
C23	.003	1000	8R13165	P1088-003		PTE16D3		PT1623	MB-D3	
C24	.02	1000	8K114137	P1088-02		PTE16S2		PT1612	MB-S2	
C25	.5	100	8K17028	P185-5		MP2P5		RF480	68P20	

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	MOTOROLA PART No.	IRC PART No.	NOTES
R20	680Ω	1/2	6R6040	BTS-680	
R21	470KΩ	1/2	6R6377	BTS-470K	
R22	100KΩ	1/2	6R6075	BTS-100K	
R23	330KΩ	1/2	6R2096	BTS-330K	
R24	33KΩ	1/2	6R6410	BTS-33K	

ITEM No.	RATING: OHMS	RATING: WATT	MOTOROLA PART No.	IRC PART No.	NOTES
R25	180Ω	1	6R6390	BTA-180	
R26	1Meg	1/2	6R6004	BTS-1Meg	
R27	1500Ω	2	6R2005	BTB-1500	
R28	56Ω	1/2	6R5614		
R29	56Ω	1/2	6R5614		

TRANSFORMER (VIBRATOR)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	MOTOROLA PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T3	6.3VCT @5.4A	464VCT .043ADC			25K512083		P-3068 ①	TV-16K①	V3803 ①	T-22R27 ①

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	MOTOROLA PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T4	7KΩ CT	3.2Ω	25B502331	A-3823 ①	A-2900	S-51X	Z1113	26S48 ①	① Drill one new mounting hole.

COILS (RF-IF)

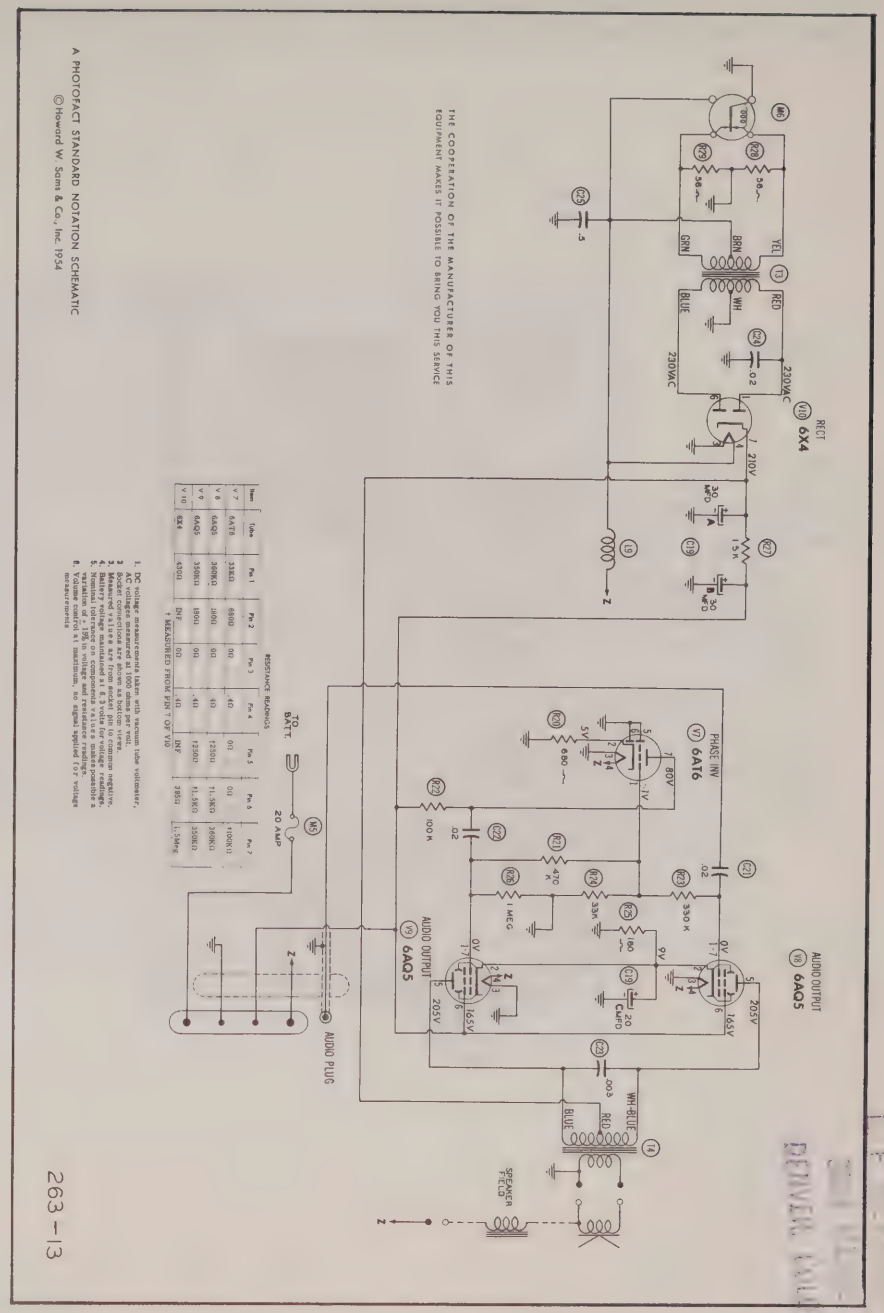
ITEM No.	USE	DC RES.: PRI.	DC RES.: SEC.	MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L9	Vib. Hash Choke	0Ω		24A512119				47 Microhenries

FUSES

ITEM No.	TYPE	RATING	MOTOROLA PART No.: FUSE	MOTOROLA PART No.: HOLDER	LITTELFUSE PART No.: FUSE	LITTELFUSE PART No.: HOLDER	BUSS PART No.: FUSE	BUSS PART No.: HOLDER
M5	SFE	20A	65K4637	9K592237	307020	157020	SFE-20	HDJ-A

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	MOTOROLA PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	NOTES
M6	Int.	6.3V	115∿	48B3333	5342	859	5342	

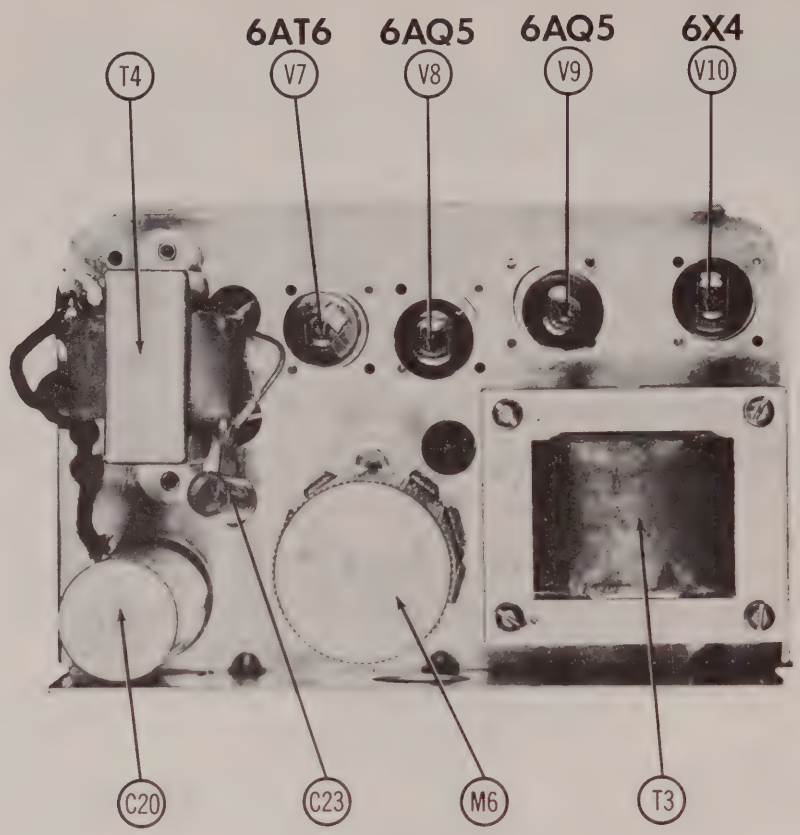


CH. P8-2

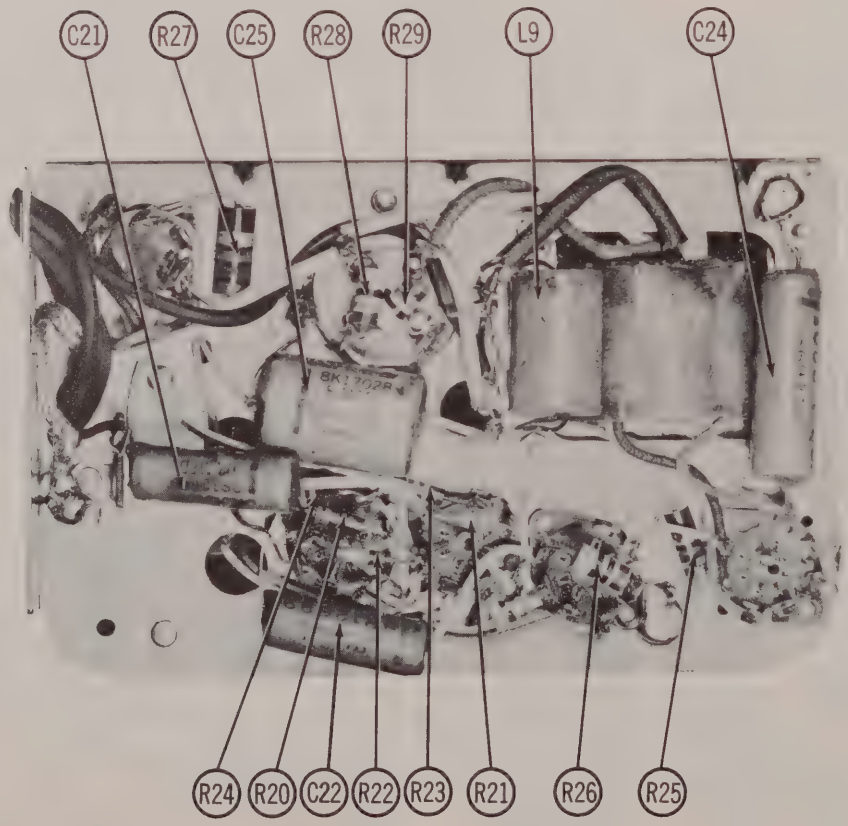
SET 263

FOLDER 13

PAGE 7



CHASSIS P8-2-TOP VIEW



CHASSIS P8-2-BOTTOM VIEW

PROPERTY OF
L. F. DANKENSHIP
3924 WADE ST.
DENVER, COLORADO

STROMBERG-CARLSON
MODEL HI FI ET

STROMBERG-CARLSON
MODEL HI FI ET

TRADE NAME	Stromberg-Carlson Model HI FI ET
MANUFACTURER	Stromberg-Carlson Co., Radio & Television Div., 1225 Clifford Ave., Rochester 21, N.Y.
TYPE SET	AC Operated Phono Amplifier With 3 Speed Automatic Record Changer
TUBES (Three)	Types 12AX7 AF Amp.-Phase Inv., (2) 50L6GT Output
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .47 Amp. @ 117 Volts AC

FOR SERVICE INFORMATION ON RECORD CHANGER UNIT 148052 - SEE V-M MODEL 950, PHOTOFACT SET #216 - FOLDER 11, OR RECORD CHANGER MANUAL CM-5.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

STROMBERG-CARLSON
MODEL HI FI ET

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: Stromberg-Carlson PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	AF Amplifier-Phase Inverter	12AX7	12AX7	9A	
V2	Output	50L6GT	50L6GT	7S	
V3	Output	50L6GT	50L6GT	7S	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	Stromberg-Carlson PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	350	111108	AFH3-44		C035		FP377	TVL-3787	
B	■40	350								
C	▲40	350								
C2	40	200	111109			BR4025		TC58	TVA-1511	
C3	5	25	111110	PRS150/4		BR550		TC30	TVA-1203	
C4	.047	200	110703	P288-047	DF-503	PJ2S47		PT4147	2TM-S47	
C5	.22	200	110707	P288-22		PJ2P22		PT4022	2TM-P22	
C6	.22	200	110707	P288-22		PJ2P22		PT4022	2TM-P22	
C7	.068	200	110704	P288-068		PJ2S68		PT4168	2TM-S68	
C8	.001	400	110712	P488-001	D6-102	CUB4D1	GP2L-102	PT421	4TM-D1	
C9	.0022	400	110817	P488-0022	D6-222	CUB4D22	GP2-333-222	PT4222	4TM-D22	
C10	.022	400	110542	P488-022		CUB4S22		PT4122	4TM-S22	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	Stromberg-Carlson PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg	½	145153			B-70-S		Volume & Switch
B	Shaft		Not Req.			AK-26		Attach to R1A
R2A	10KΩ	½	145154	Q11-116	A47-10K-S	B-14	U-20	Treble
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A
R3A	500KΩ	½	145155			B-60		Bass
B	Shaft		Not Req.			AK-26		Attach to R3A

RESISTORS

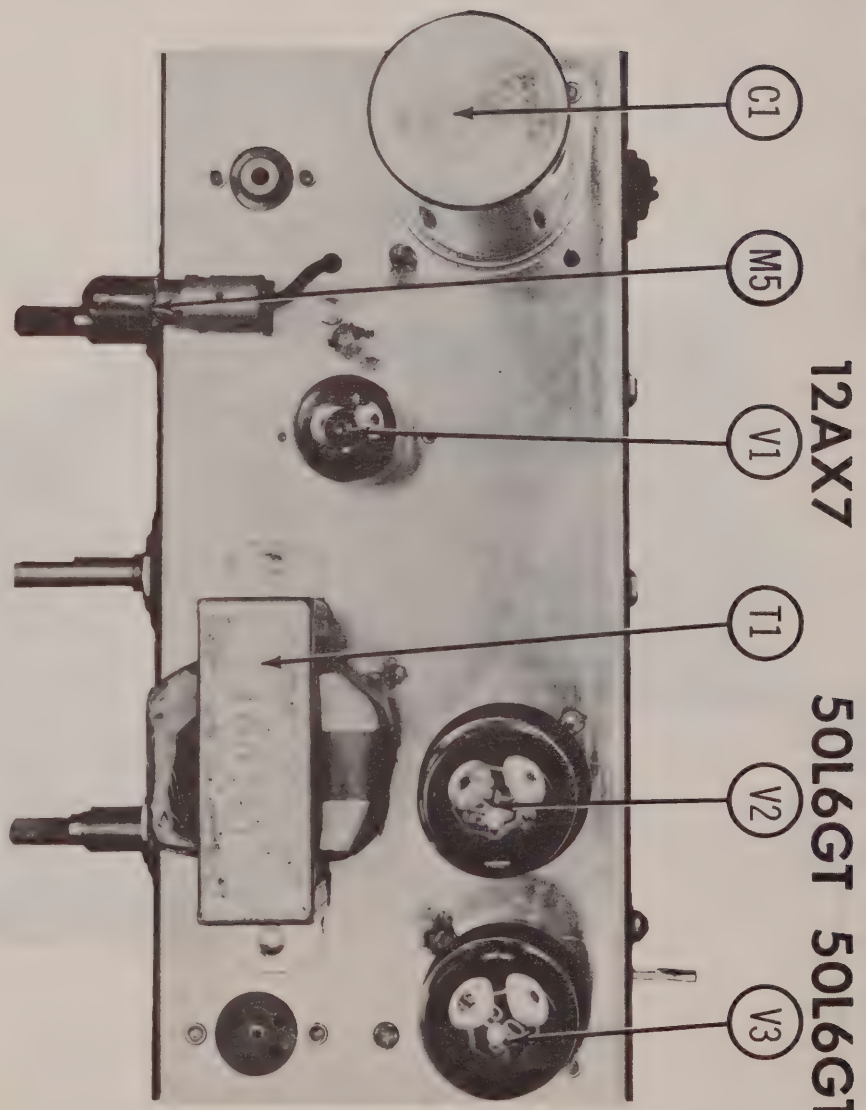
ITEM No.	RATING OHMS	RATING WATT	Stromberg-Carlson PART No.	IRC PART No.	NOTES
R4	1000Ω	½	28158	BTS-1000	
R5	4700Ω	½	149105	BTS-4700	
R6	2700Ω	½	28163	BTS-2700	
R7	390KΩ	½	28186	BTS-390K	
R8	22KΩ	½	149384	BTS-22K	
R9	4700Ω	½	149105	BTS-4700	
R10	390KΩ	½	28186	BTS-390K	
R11	470KΩ	½	149117	BTS-470K	
R12	120Ω	2	149035		

ITEM No.	RATING OHMS	RATING WATT	Stromberg-Carlson PART No.	IRC PART No.	NOTES
R13	10KΩ	2	149082	BTB-10K	
R14	470KΩ	½	149117	BTS-470K	
R15	56Ω	2	149032		
R16	400Ω	7	149438	1 3/4A-400	
R17	33Ω	2	149067		
R18	33Ω	2	149067		
R19	1Meg	½	149119	BTS-1Meg	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	Stromberg-Carlson PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	5.7KΩ	2.9Ω	161047	A-3830	A-2935	S-55X	Z1011		

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	Stromberg-Carlson PART No.	JENSEN PART No.	QUAM PART No.	
SP1	8"	PM	2.9Ω	155764	ST-115 Mod. P8-V	8A31	

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	Stromberg-Carlson PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	SELETRON PART No.	
M1	.104A	162183	1005A	RS150	6S150	150	5P1	
M2	.104A	162183	1005A	RS150	6S150	150	5P1	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA							REMARKS
	Stromberg-Carlson PART No.	ASTATIC PART No.		SHURE PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M3						47	0-1 or S-1 & 0-3	

ELECTRO-VOICE NEEDLE LISTING SHOWN ABOVE IS SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENT SEE BELOW.

PHONO NEEDLE

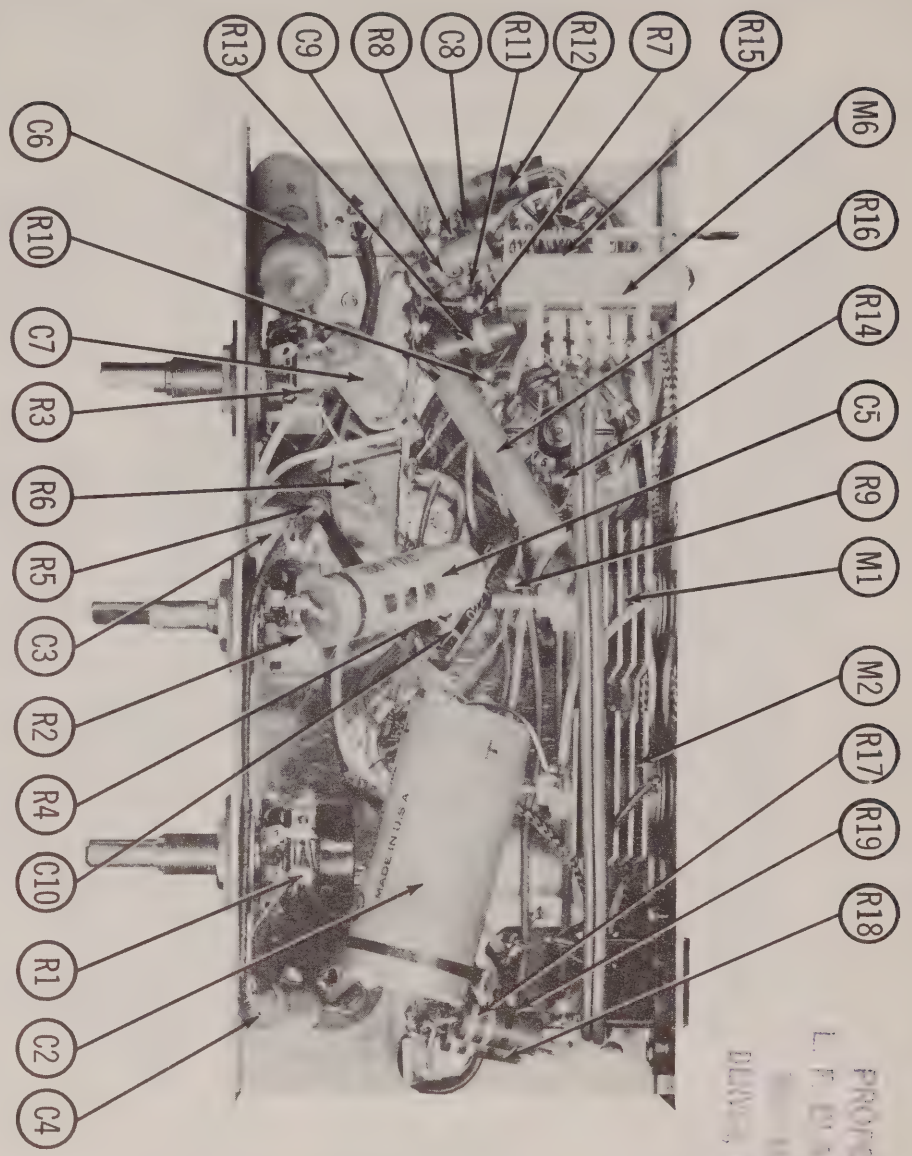
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA				REMARKS
	Stromberg-Carlson PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	
M4		†S-66	†AC-434 ♦†AC-434D1 †♦AC-434D2 ♦AC-434D	†W-75TPS	†Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	Stromberg-Carlson PART No.	NOTES
M5	Dial Light	137008	Neon #51, Bayonet
M6	Switch	158050	Interlock
	Cabinet	108342	
	Knob	134136	(3 used)

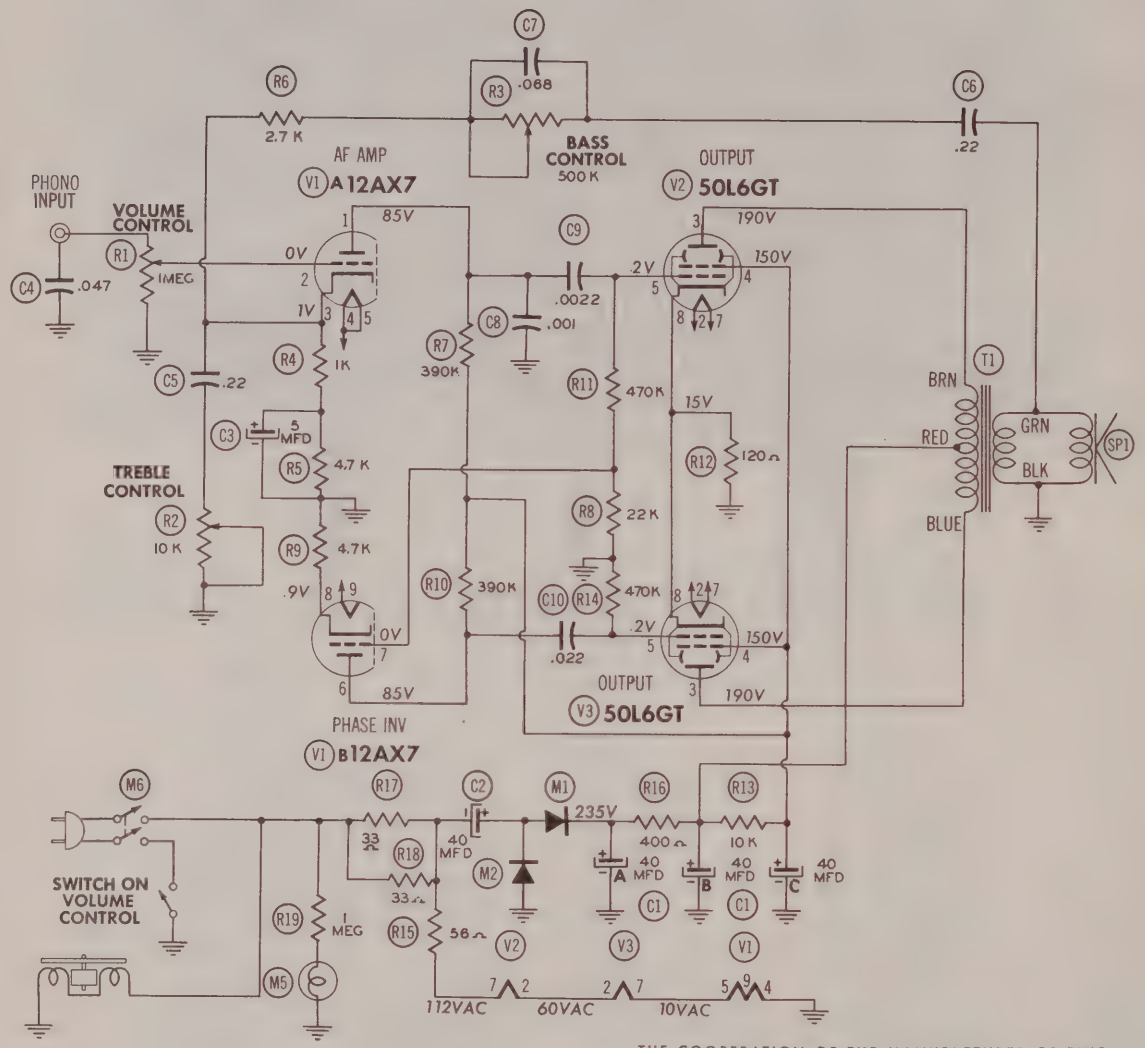
CHASSIS—BOTTOM VIEW



PROPERTY OF
L. F. ELECTRONICS SHOP
BOULDER, COLORADO

STROMBERG-CARLSON
MODEL HI FI ET

STROMBERG-CARLSON
MODEL HI FI ET



THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AX7	†400KΩ	180KΩ	5.7KΩ	0Ω	14Ω	†400KΩ	22KΩ	4.7KΩ	7Ω
V 2	50L6	0Ω	65Ω	†550Ω	†10.4KΩ	492KΩ	0Ω	120Ω	120Ω	
V 3	50L6	0Ω	65Ω	†550Ω	†10.4KΩ	470KΩ	0Ω	14Ω	120Ω	

† MEASURED FROM OUTPUT OF M1 (SELENIUM RECTIFIER)

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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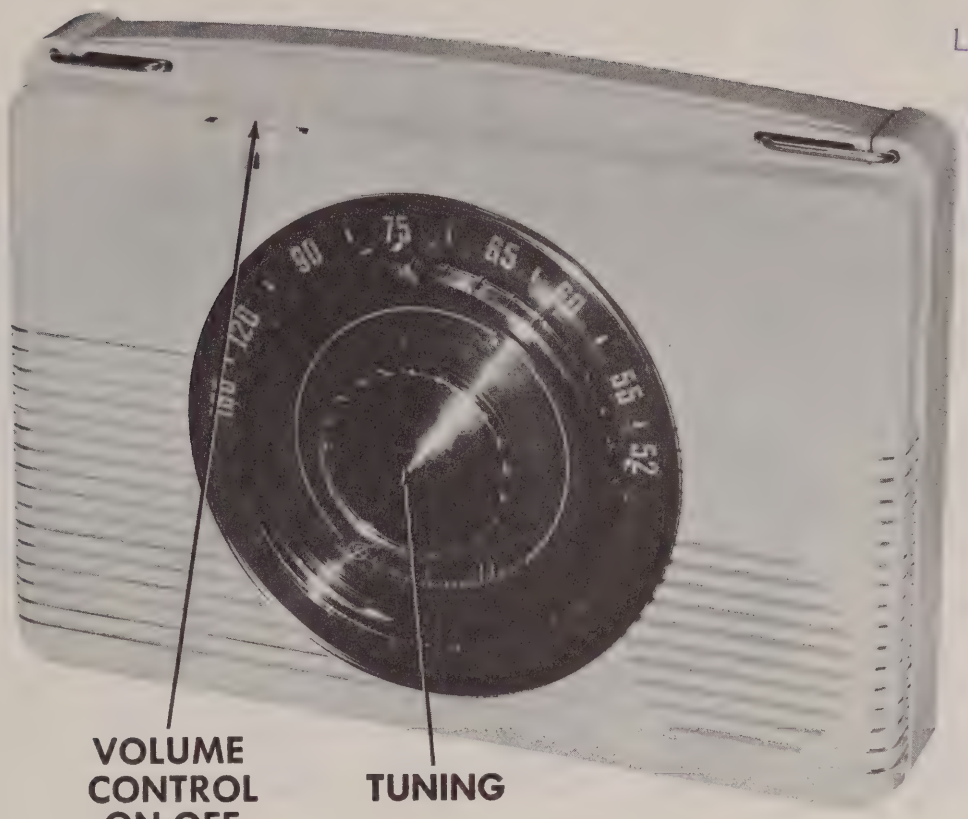
PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



SYMPHONETTE
MODEL 45-KA-37

TRADE NAME	Symphonette Model 45-KA-37
MANUFACTURER	Hedco Mfg. Corp., 161 W. Huron St., Chicago 10, Ill.
TYPE SET	Battery Operated Portable AM Superheterodyne Receiver
TUBES (Four)	Types 1R5 Conv., 1T4 IF Amp., 1S5 Det-AVC-AF Amp., 3V4 Output
POWER SUPPLY	1.5 Volts "A" Supply & 67.5 Volts "B" Supply
RATINGS	260MA @ 1.5 Volts DC & 11 MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	520KC - 1640KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1MFD	High side to pin 6 (grid) of 1R5 (V1). Low side to chassis.	460KC (400~ Mod.)	Tuning gang fully open.	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2		Loop	1620KC	Tune to 1620KC signal.	"	A5	"
3		"	1400KC	Tune to 1400KC signal.	"	A6	"

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PARTS LIST AND DESCRIPTIONS

SYMPHONETTE MODEL 45-KA-37

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: SYMPHONETTE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	Converter	1R5	1R5	7AT	
V2	IF Amp.	1T4	1T4	6AR	
V3	Det-AVC-AF Amp.	1S5	1S5	6AU	
V4	Output	3V4	3V4	6BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Symphonette PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1	5	90	35Z100							
C2	.05	175	38Z104		DF-503					
C3	100		38Z100	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C4	10000		38Z102	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C5	10000		38Z102	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C6	100		38Z100	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C7	2500		38Z103	SI2500	D6-252	TP58	GP2-333-252	UC-5225	5GA-T25	
C8	100		38Z100	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C9	.05	175	38Z105		DF-503					
C10	500		38Z101	SI500	D6-501	TP47	GP1K-501	UC-535	5GA-T5	
C11	5000		38Z106	BPD-005	DD-502	K080	801-005	DC-525	51K-D5	

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: Symphonette PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	2Meg	½	18Z100					Volume & Switch

RESISTORS

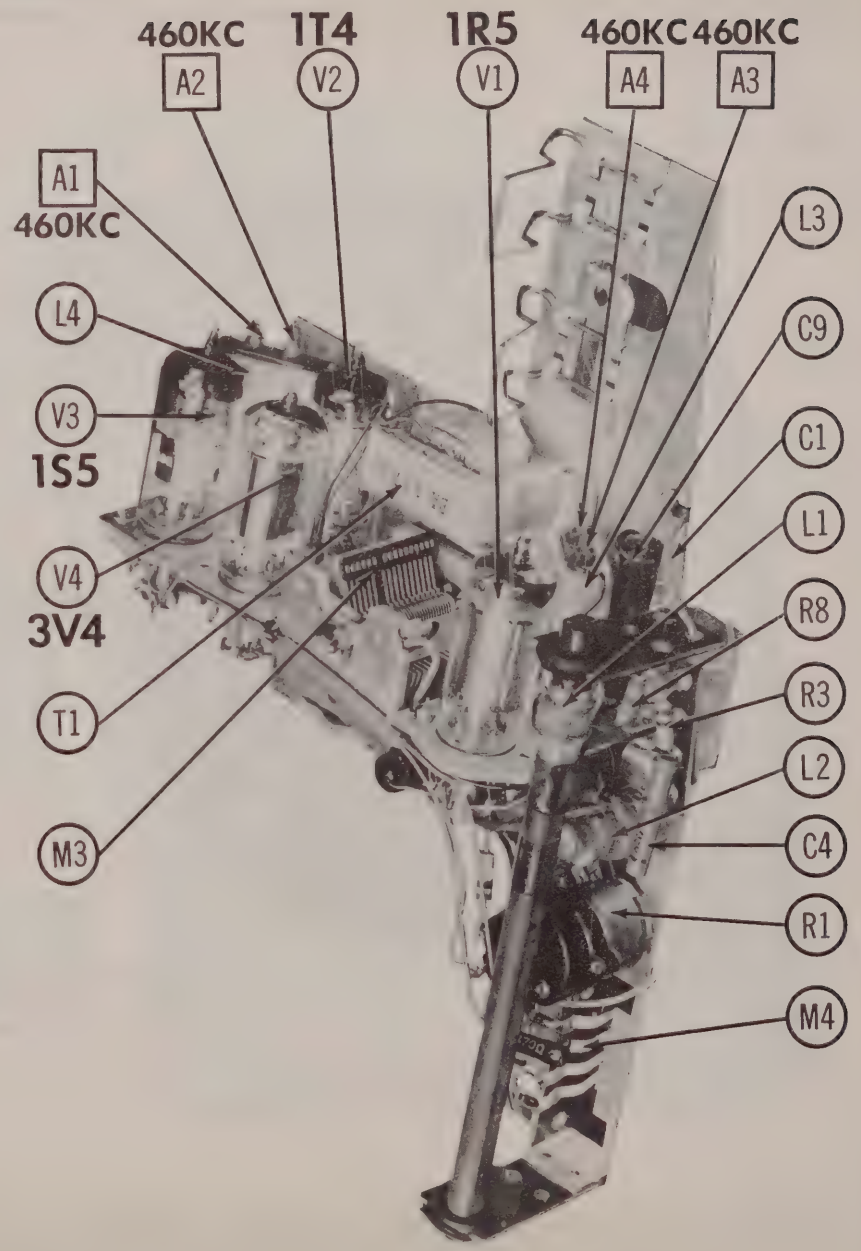
ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Symphonette PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R2	100KΩ	½	38Z109	BTS-100K	
R3	10KΩ	½	38Z115	BTS-10K	
R4	3Meg	½		BTS-3.3Meg	
R5	2000Ω	½	38Z107	BTS-1800	
R6	100KΩ	½	38Z109	BTS-100K	
R7	10Meg	½	38Z113	BTS-10Meg	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Symphonette PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R8	5.1Meg	½	38Z112	BTS-4.7Meg	
R9	1Meg	½	38Z110	BTS-1Meg	
R10	2Meg	½	38Z111	BTS-2Meg	
R11	370Ω	½	38Z116	BTS-390	
R12	300Ω	½	38Z114	BTS-330	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: Symphonette PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	8KΩ	4.8Ω	31Z100						

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	Symphonette PART No.	JENSEN PART No.	QUAM PART No.	
SP1	2½"	PM	4. 8Ω	12Z100			

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	Symphonette PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	1Ω		9Z100				
L2	Osc. Coil	1. 1Ω	2. 4Ω	9Z104				
L3	Input IF	13Ω	13Ω	9Z102				
L4	Output IF	12Ω	12Ω	9Z103				

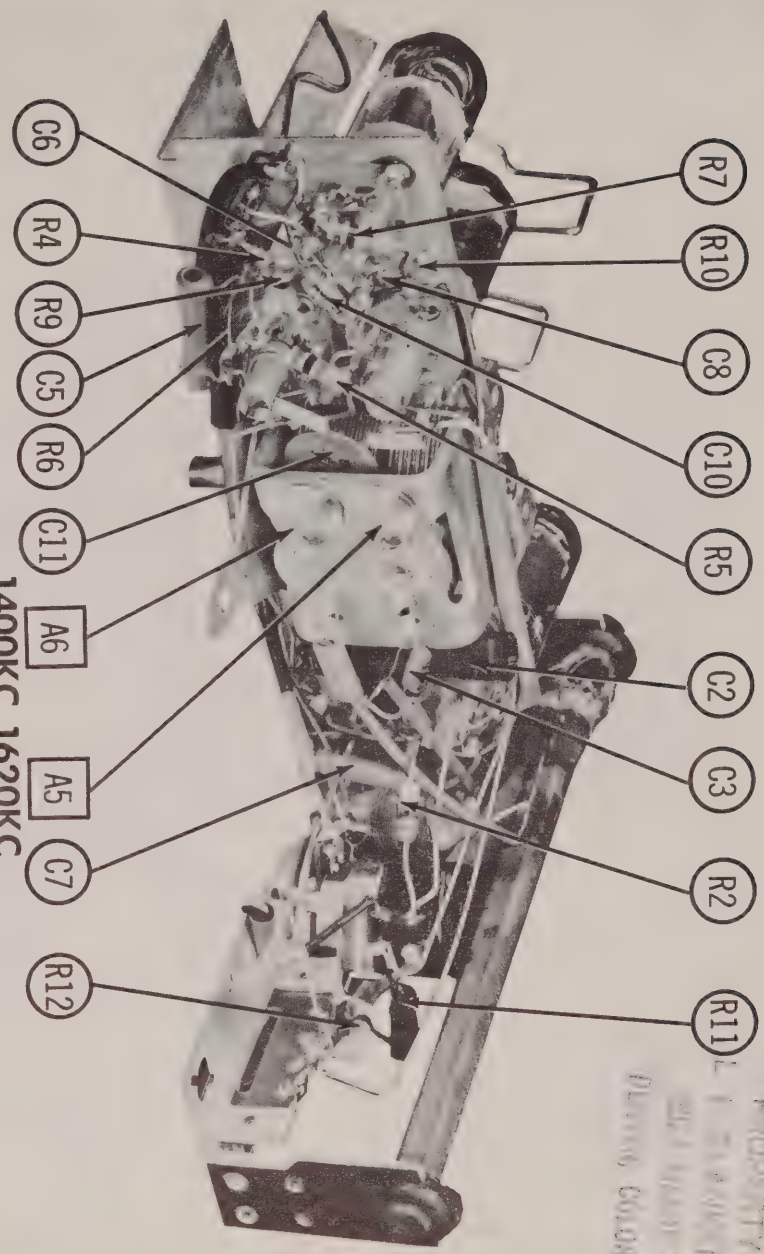
BATTERIES

ITEM No.	VOLTAGE	Symphonette PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M1	1. 5V		950			2R			Connect 2 in parallel.
M2	67. 5V			467			XX45		

MISCELLANEOUS

ITEM No.	PART NAME	SYMPHONETTE PART No.	NOTES
M3	Tuning Cap	14Z100	13-320MMF; 20-144MMF.
M4	Switch	1Z100	Battery Saver
	Cabinet	16Z100	Case (less back)
	Knob	10Z100	Tuning
	Knob	10Z101	Volume
	Knob	10Z102	Battery Saver Switch
	Handle	40Z100	
	Dial Scale	20Z100	

CHASSIS—BOTTOM VIEW



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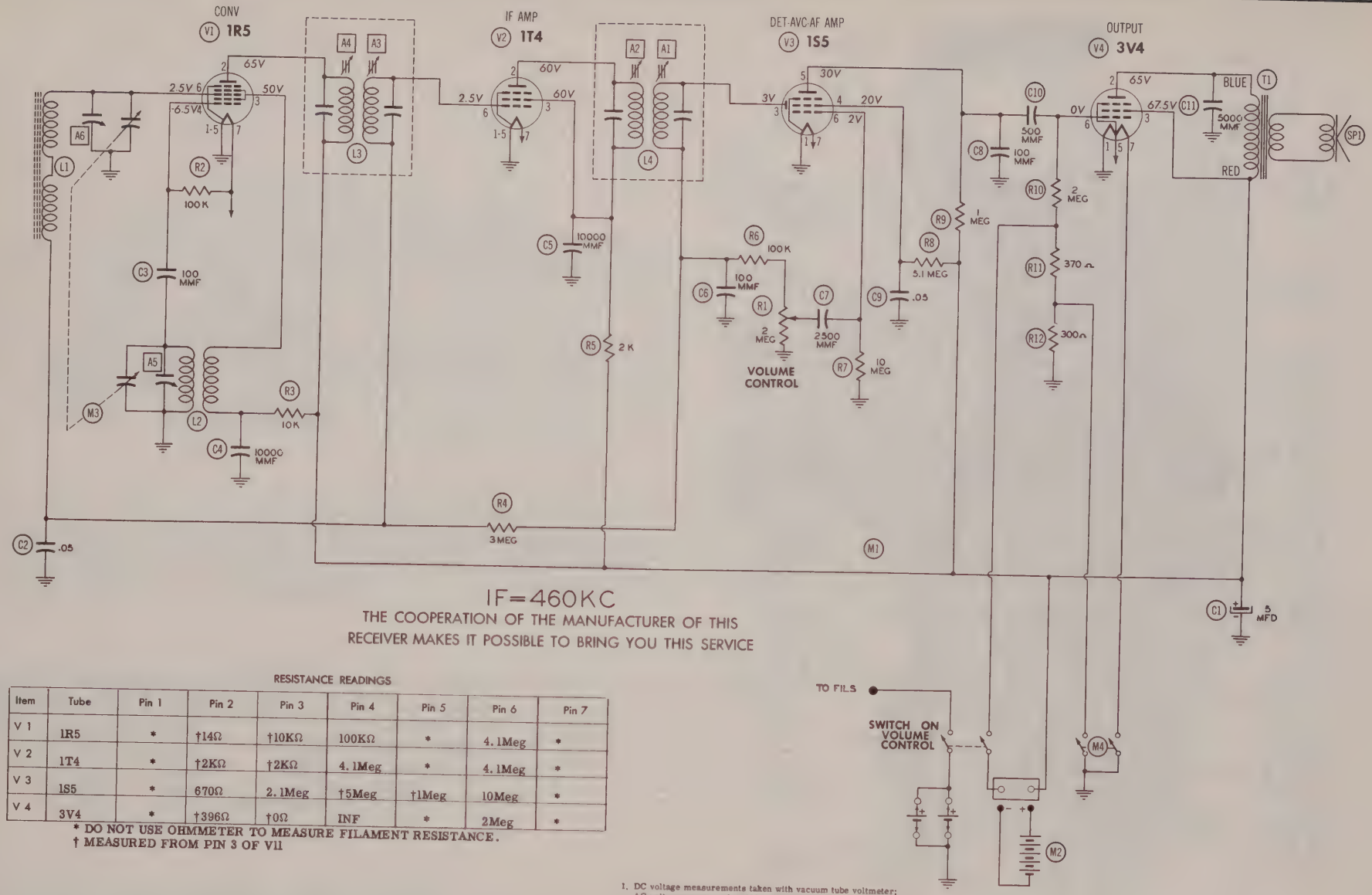
SYMPHONETTE
MODEL 45-KA-37



IF=460KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	*	†14Ω	†10KΩ	100KΩ	*	4.1Meg	*
V 2	1T4	*	†2KΩ	†2KΩ	4.1Meg	*	4.1Meg	*
V 3	1S5	*	670Ω	2.1Meg	†5Meg	†1Meg	10Meg	*
V 4	3V4	*	†396Ω	†0Ω	INF	*	2Meg	*

* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.
† MEASURED FROM PIN 3 OF V11

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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263-15

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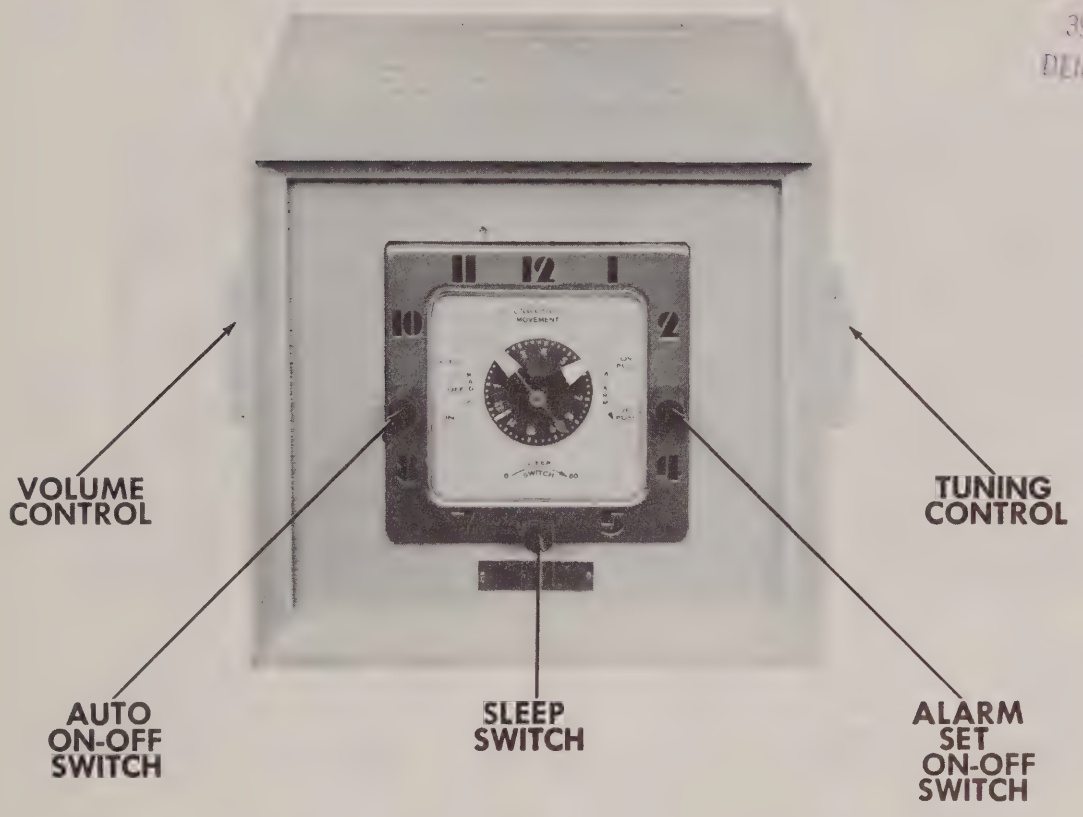
TRAVLER
MODELS 5182-B, -M



TRAVLER
MODELS 5182-B, -M

TRADE NAME	Travler Models 5182-B, -M
MANUFACTURER	Travler Radio & Tel. Corp., 571 W. Jackson Blvd., Chicago, Ill.
TYPE SET	AC Operated AM Superheterodyne Receiver With Electric Clock
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-125 Volts AC-60 Cycles — RATING .25 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1630KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to antenna stator lug on tuning gang. Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1630KC	"	"	A5	"
3.		Loop	1400KC	Tune 1400KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

TRAVLER MODEL 5182-B

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: TRAVLER PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amplifier	12BA6	12BA6	7BK	
V3	Det.-AVC-AF Amp.	12AV6	12AV6	7BT	
V4	Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	40	150	EC-12A	PRS150/40-		BBRD4215		TCD485	TVA-2438	Red
B	20	150		20						White
C2	.05	200		P288-05	DF-503	PJ2S5		PT415	2TM-S5	Note 1
C3	47		CC-12	SI47	D6-470	TP29	GPIK-470	UC-5447	5GA-Q47	
C4A	220									
B	2000									
C	5000		*PC-150	*PA-113-1	*PC-150	*116TM1	*1408-01		*DT-1	
D	250									
E										
C5	.005	600	PC-6	P688-005	D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5	
C6	.05	400	PC-5	489ZX-05	DF-503	PJ4S5		PT415	4TM-S5	
C7	.1	400	PC-8	P488-1	DF-104	CUB4P1		PT401	4TM-P1	

Note 1. Some models may use an .01MFD capacitor in this application.
* Items C4A, C4B, C4C, C4D, C4E, R7A, R7B and R7C are combined in one unit.
When replaced individually items C4D and C4E should total 250MMF .

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg	½	VC-49	Q13-137	A47-1Meg-Z	B-70	U-53	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A

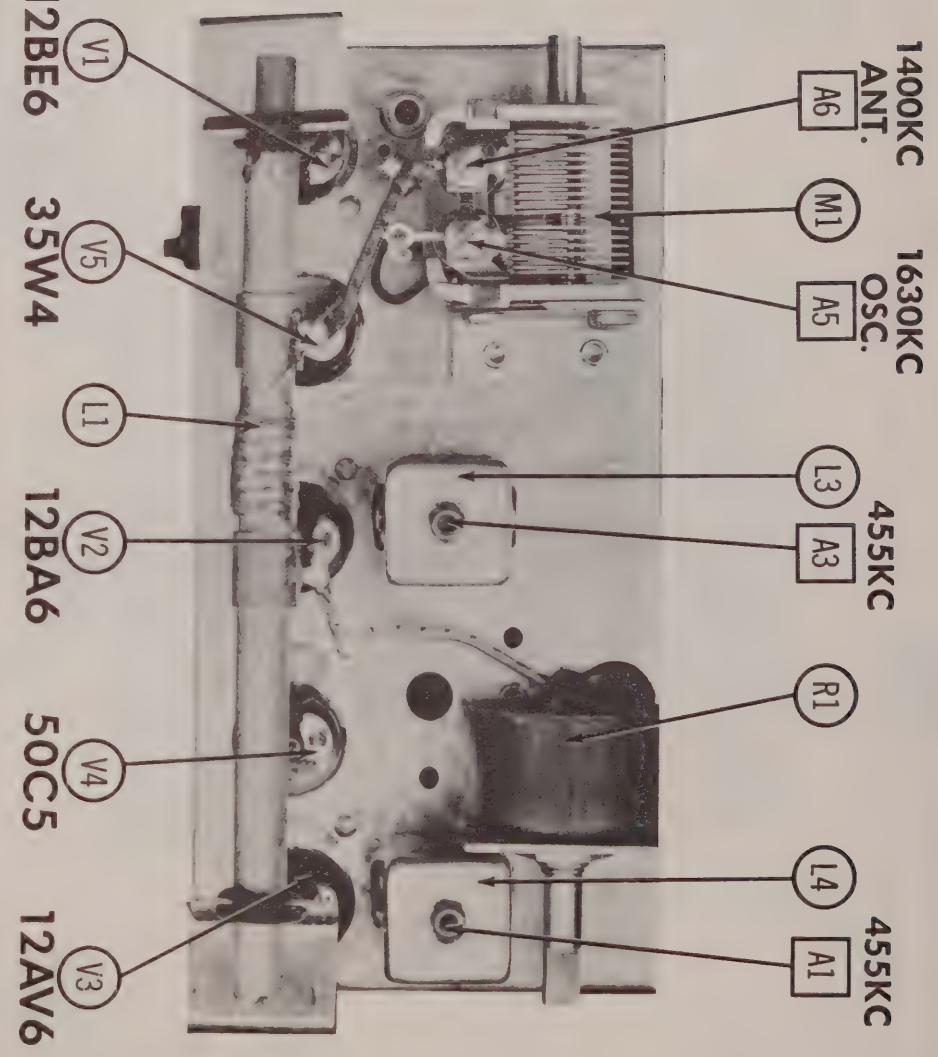
RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: TRAVLER PART No.	IRC PART No.	NOTES
R2	33Ω	½	IR-17	BTS-33	
R3	22KΩ	½	IR-9	BTS-22K	
R4	220KΩ	½	IR-20	BTS-220K	
R5	1000Ω	½	IR-112	BTS-1000	
R6	3.3Meg	½	IR-23	BTS-3.3Meg	
R7A	6.8Meg	½		BTS-6.8Meg	
B	470KΩ	½	*PC-150	BTS-470K	
C	470KΩ	½		BTS-470K	

♦ Items R7A, R7B, R7C, C4A, C4B, C4C, C4D, C4E are combined in one unit.

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: TRAVLER PART No.	IRC PART No.	NOTES
R8	150Ω	½	IR-14	BTS-150	
R9	2200Ω	1	IR-25	BTA-2200	
R10	33Ω	½	IR-17	BTS-33	
R11	33Ω	½	IR-17	BTS-33	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	TRAVLER PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T1	2.3KΩ	3.4Ω	Part of Spkr.	A-3332	A-3025	S-12X	Z1101		

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	TRAVLER PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.4Ω	SPK-22B SPK-35 ①	ST-113 Mod. P4-X	4A07	① Alternate PM speaker

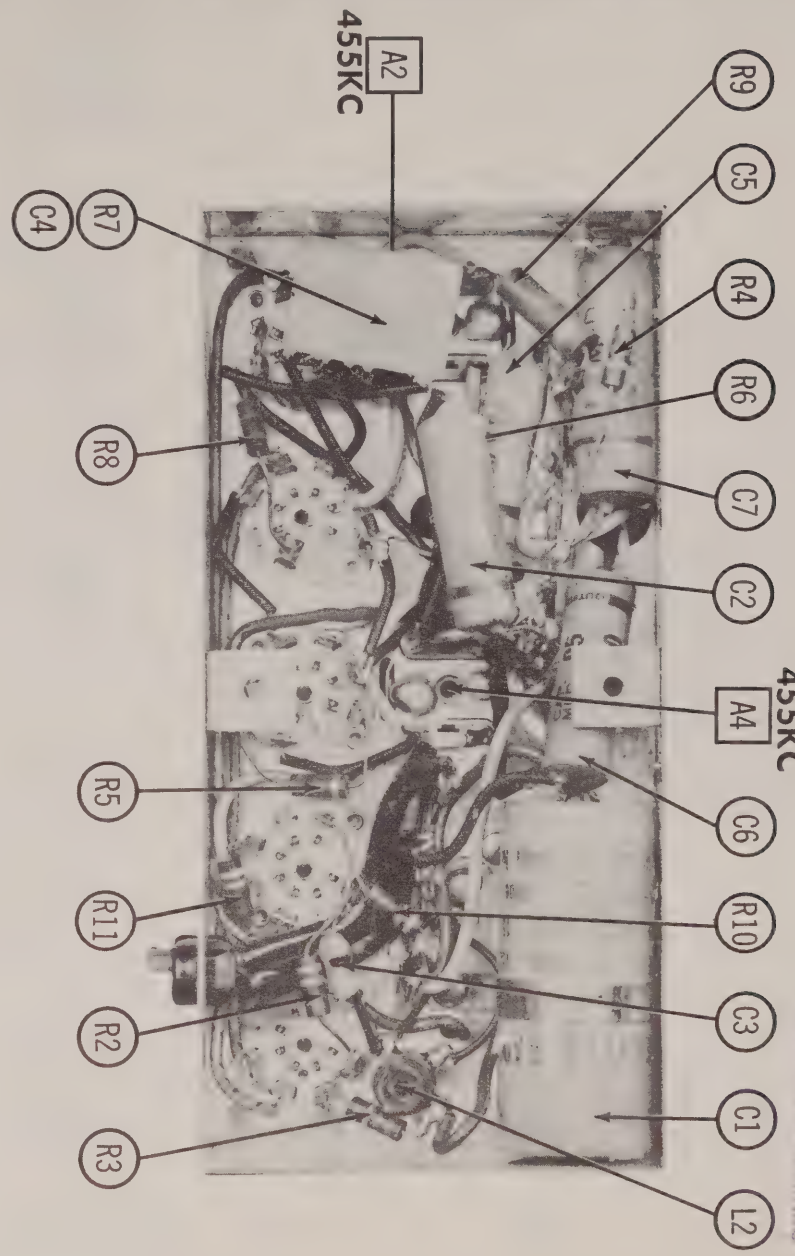
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	TRAVLER PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	2Ω		LL-35				
L2	Osc. Coil	.6Ω	7.5Ω	LO-20	14-1040		71-Osc.	
L3	Input IF	32Ω	32Ω	LI-10	16-6758	BC-352	12-C1	
L4	Output IF	42Ω	42Ω	LI-11	16-6758	BC-353	12-C2	

MISCELLANEOUS

ITEM No.	PART NAME	TRAVLER PART No.	NOTES
M1	Tuning Cap. Clock	GC-12 CK-1	13-240MMF, 13-110MMF

CHASSIS—BOTTOM VIEW



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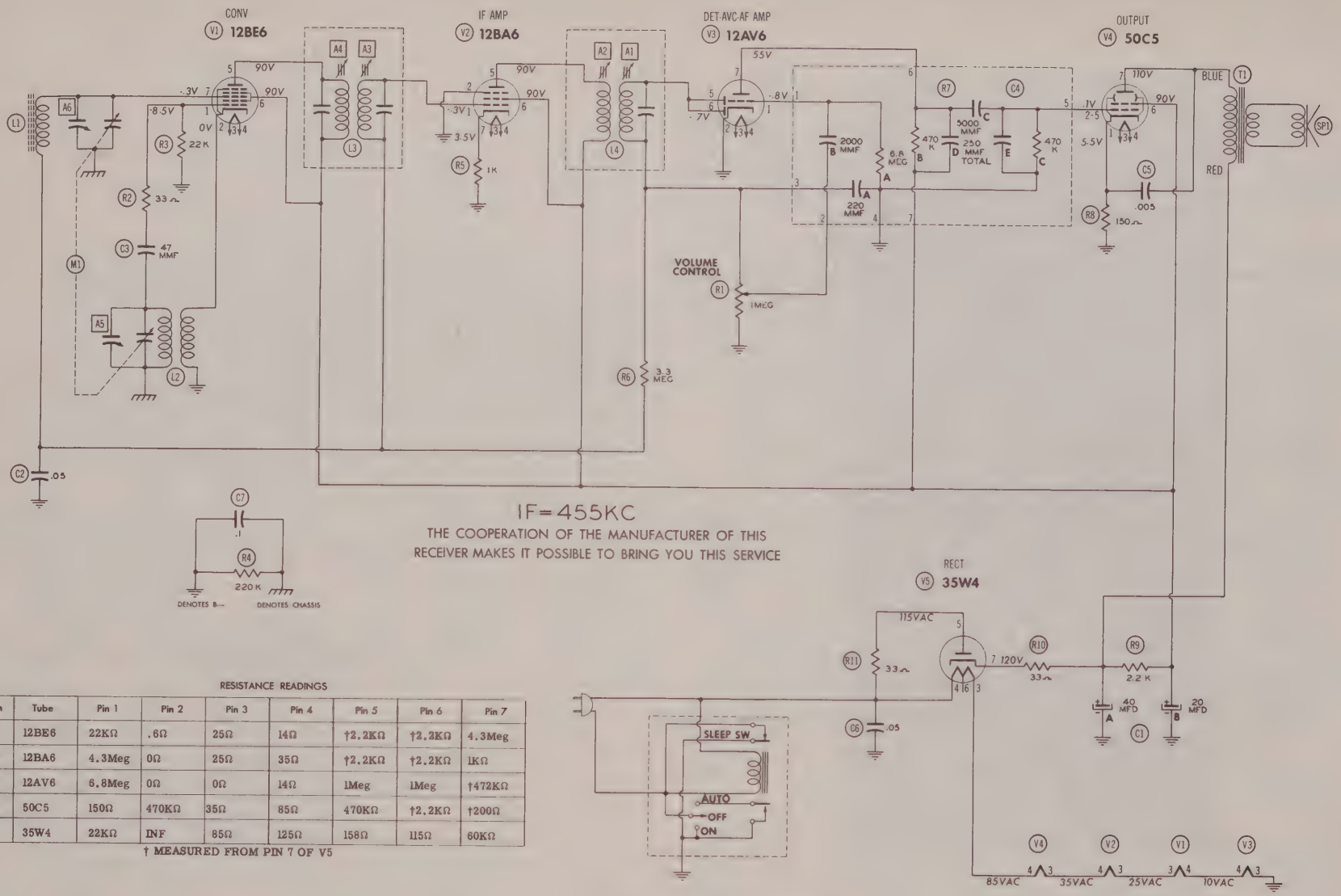
TRAVLER MODEL 5182-B

TRAVLER MODEL 5182-B



IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.6Ω	25Ω	14Ω	†2.2KΩ	†2.2KΩ	4.3Meg
V 2	12BA6	4.3Meg	0Ω	25Ω	35Ω	†2.2KΩ	†2.2KΩ	1KΩ
V 3	12AV6	6.8Meg	0Ω	0Ω	14Ω	1Meg	1Meg	†472KΩ
V 4	50C5	150Ω	470KΩ	35Ω	85Ω	470KΩ	†2.2KΩ	†200Ω
V 5	35W4	22KΩ	INF	85Ω	125Ω	158Ω	115Ω	60KΩ

† MEASURED FROM PIN 7 OF V5

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements

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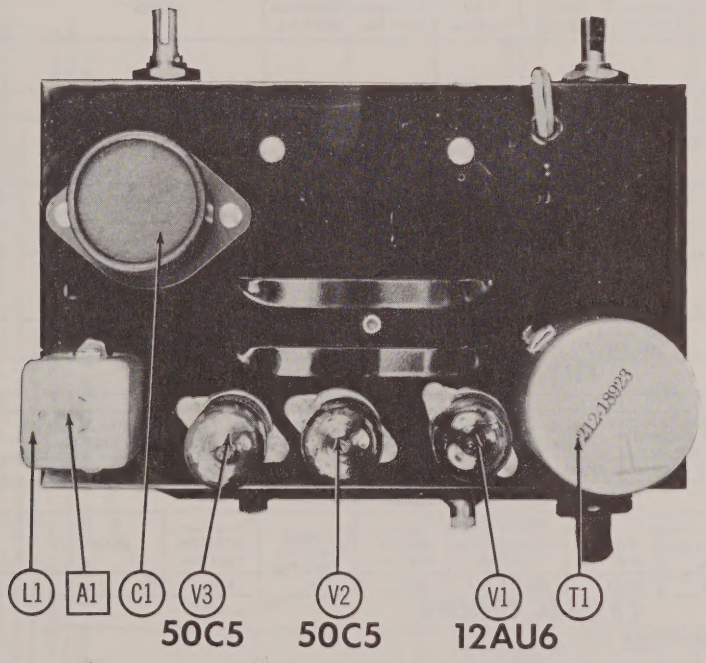
WEBSTER ELECTRIC
MODELS RFM1-1, -2, -3

WEBSTER ELECTRIC
MODELS RFM1-1, -2, -3

TRADE NAME	Webster Electric Models RFM1-1, -2, -3
MANUFACTURER	Webster Electric Co., Racine, Wisc.
TYPE SET	AC Operated Wireless Intercommunication System
TUBES (Three)	Types 12AU6 AF Amp., 50C5 Modulator-AF Output, 50C5 RF Oscillator
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .26 Amp. @ 117 Volts AC



CHASSIS TOP VIEW

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: Webster Electric PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	AF Amplifier	12AU6	12AU6	7BK	
V2	Modulator-Audio Output	50C5	50C5	7CV	
V3	RF Oscillator	50C5	50C5	7CV	

CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Webster-Electric PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	■50	150	P10695-1	AFH3-09		C011				
B	▲30	150								
C	10	150								
C2	5	50	211-18969	SRE50/6		BBR-5-50		TC30	TVA-1303	
C3	500		S3750	SI500	D6-501	TP47	GP2K-501	UC-535	5GA-T5	
C4	1000		S6065-5	SI1000	D6-102	TP52	GP2L-102	UC-521	5HK-D1	
C5	.005	600	S4512	P688-005	D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5	
C6	.47	200	211-1893	P288-47		CUB2P47		PT4047	2TM-P47	
C7	.01	400	S3521	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C8	200		S6065-3	SI200	D6-201	TP38	GP2K-201	UC-532	5GA-T2	
C9	1000	500	211-18966	1464-102		IR5D1		MCB255	MS-21	
C10	1000	500	211-18966	1464-102		IR5D1		MCB255	MS-21	
C11	.02	400	211-19148	P488-02	DF-203	CUB4S2	817-02	PT412	4TM-S2	
C12	.2	400	211-14492	P488-22		CUB4P22		PT402	4TM-P2	
C13	.1	400	211-13083	P488-1	DF-104	CUB4P1		PT401	4TM-P1	

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: Webster-Electric PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	1MΩ		S6926-2					Volume and switch
R2A	500KΩ		211-18935	Q13-133	A47-500K-Z	AB-58	U-48	Squelch
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R2A

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Webster-Electric PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R3	470KΩ	½		BTS-470K	
R4	12KΩ	½		BTS-12K	
R5	270KΩ	½		BTS-270K	
R6	39KΩ	½		BTS-39K	
R7	470KΩ	½		BTS-470K	
R8	150Ω	½		BTS-150	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Webster-Electric PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R9	390KΩ	½		BTS-390K	
R10	150KΩ	½		BTS-150K	
R11	2700Ω	½		BTS-2700	
R12	220Ω	1		BTA-220	
R13	100Ω	2		BTB-100	
R14	22Ω	1			

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.#1	IMPEDANCE: SEC.	REPLACEMENT DATA: Webster-Electric PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	1.08KΩ PRI.#2 16.8KΩ	47Ω	212-18923						

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	REPLACEMENT DATA: Webster-Electric PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	4"	PM	47Ω	S6932	ST-739 Mod. P4-X	4A07Z45 ①	① Cut off opposite corners. Mount as original

COILS (RF-IF)

ITEM No.	USE	DC RES.: PRI.	DC RES.: SEC.	REPLACEMENT DATA: Webster-Electric PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Osc. Coil	0Ω		211-18925				
L2	RF Choke	63Ω		211-18927		BC-506	956	10 Microhenries

FILTER CHOKE

ITEM No.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D. C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA: Webster-Electric PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L3	.043A	158Ω	3 Hy.	212-18921					

SELENIUM RECTIFIER

ITEM No.	RATING: CURRENT	REPLACEMENT DATA: Webster-Electric PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	SELETRON PART No.	NOTES
M1	.060ADC	211-18926	1263A	RS65	6S65	65	8J1	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA: Webster-Electric PART No.	SYLVANIA PART No.	FEDERAL PART No.	NOTES
M2	1N51	211-18930	1N34 or 1N34A	1N65A	Audio Detector

MISCELLANEOUS

ITEM No.	PART NAME	Webster-Electric PART No.	NOTES
M3	Dial Light	P8914-1	#47, Bayonet
M4	Switch	212-18929	Talk-Listen
M5	Switch	211-18934	2 wire - 3 wire
	Cabinet	211-13639-5	
	Knob	211-30104	Talk-Listen
	Knob	211-30102	Volume
	Jewel	P10678	
	Name Plate	211-18918	

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS
Use an isolation transformer to protect the test equipment.
Remove chassis from cabinet.
During these checks place "TL" (Talk-Listen) lever in "Dictate" (up) position and the 2-3 wire switch in the 2 wire (left, rear view) position unless stated otherwise.
No other units should be plugged into the line during these checks.

OSCILLATOR ALIGNMENT
Connect the RF output from the oscillator coil (L), terminal "B", thru a shielded cable to the horizontal input terminals of scope. The ground terminal of scope should be connected to B- on the "intercom" thru the cable shield.
Connect RF output of signal generator across vertical input terminals of scope.
Adjust signal generator for 175KC unmodulated signal. Turn off the internal horizontal scope sweep. Adjust the vertical and horizontal gain controls on scope until a rectangular pattern appears on the screen. Adjust Al for an ellipse similar to Fig. 1 (Note: This adjustment is fine, and the ellipse will be presently only momentary when the slug passes thru resonance).

FIG.1

RF OUTPUT CHECK
Connect RF VTVM to terminal "B" of L1 and B-. Meter should indicate 3.2 VAC or more.

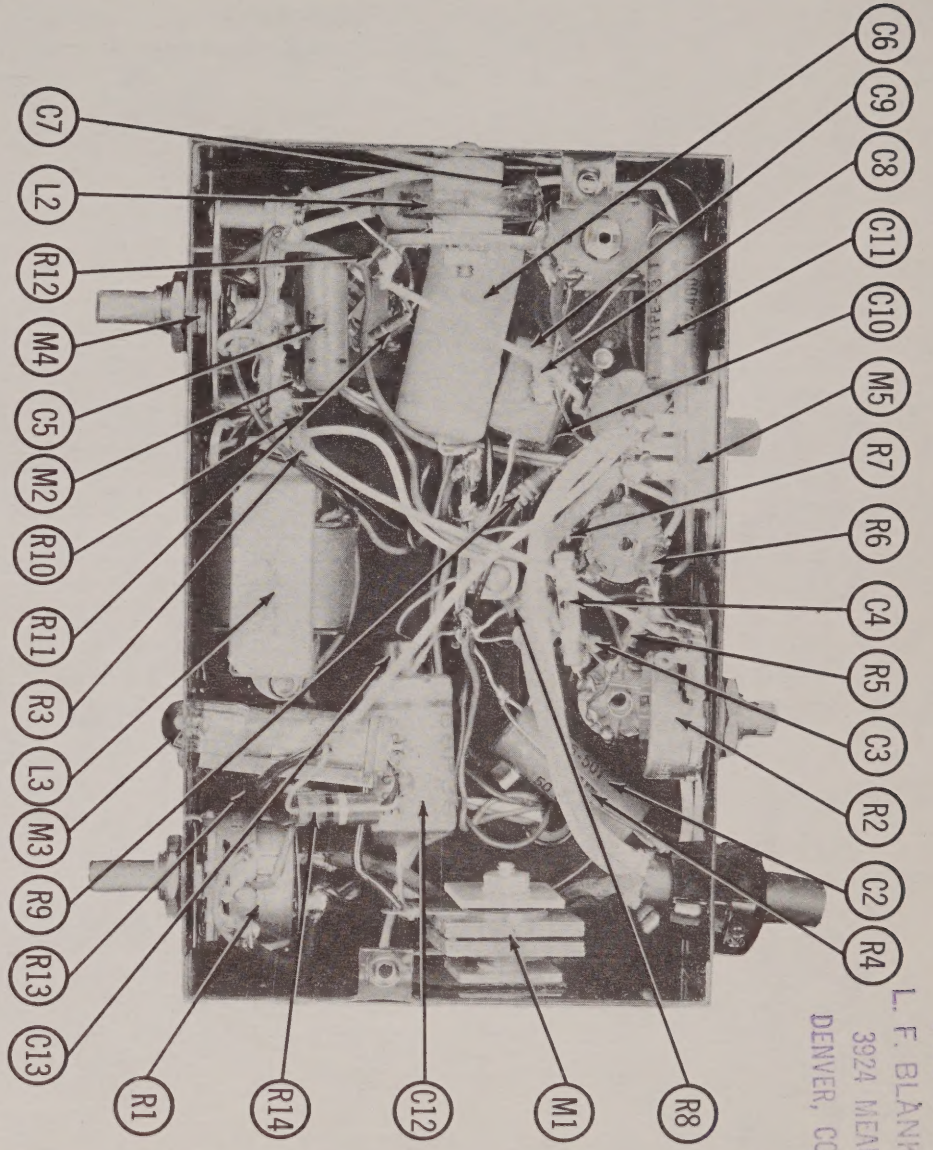
MODULATION CHECK
Connect the RF output of the "intercom" thru a shielded lead to the horizontal input terminal of scope. Connect audio output (blue lead on RF choke, L2) and B- thru shielded leads to vertical input on scope. Turn off internal horizontal scope sweep. Adjust the vertical and horizontal gain controls until a square pattern appears on screen. Remove speaker from unit and apply a .0025VAC signal at 1750 cycles across secondary of output transformer. A trapezoidal pattern should appear on the screen. Adjust the generator output for a modulation percentage not less than 30%. The modulation percentage may be determined by the following formula:

$$\text{MODULATION } \% = \frac{A-B}{A+B} \times 100$$

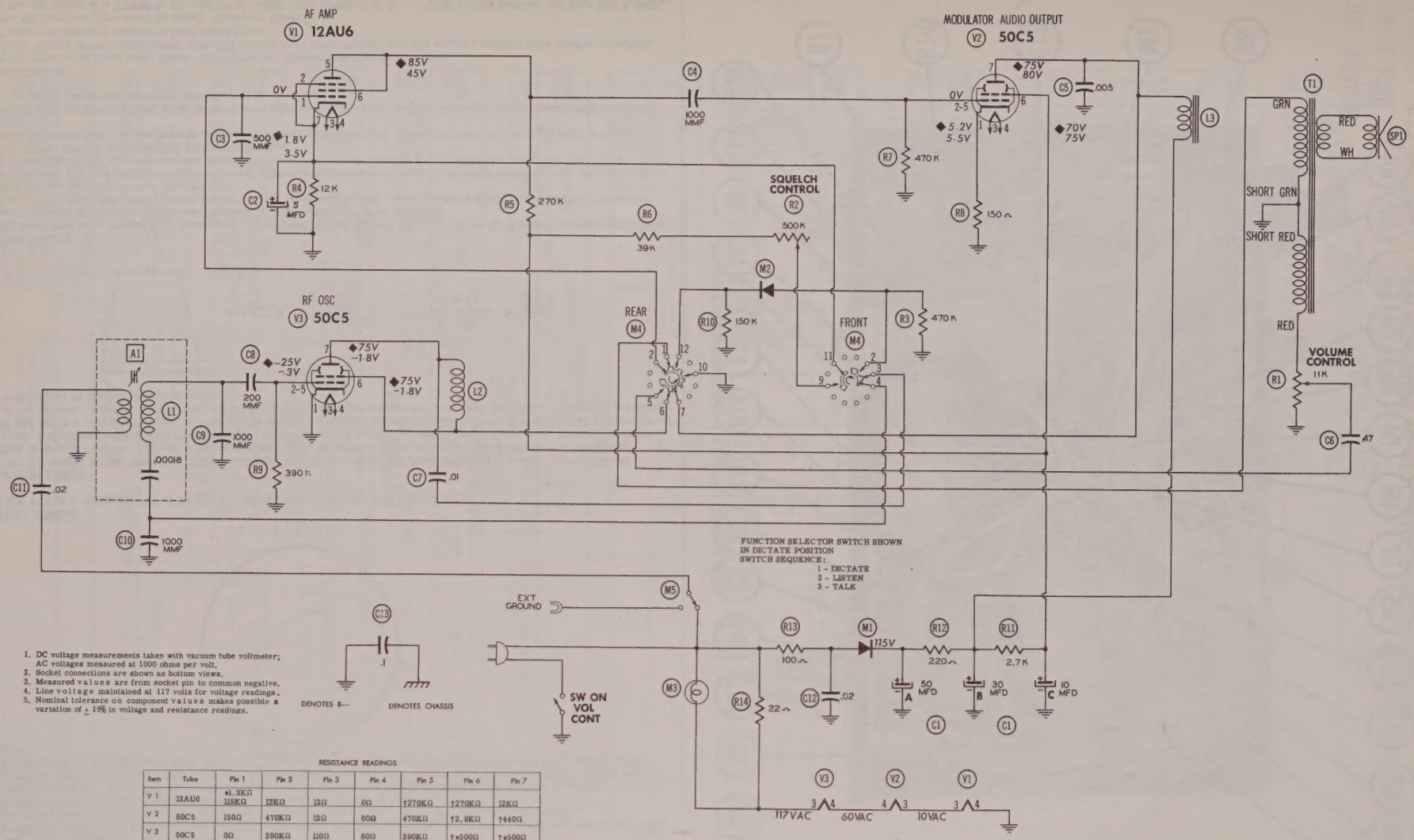
RECEIVER CHECK
Use a duplicate unit as a standard for this check. In unit be ing tested,place the "TL" lever in "Listen" position (horizontal) and squelch control MAXIMUM clockwise. Place 2-3 wire switch in 2 wire position.
Connect a .2MFD/400V capacitor across the AC line of the standard unit. Also, insert a 510Ω, 1 watt resistor between green lead and its terminal on 2-3 wire switch.
Plug the standard and test units into adjacent power receptacles (use duplex outlet). Remove speaker from the standard unit and connect an audio signal generator across secondary of output transformer. Adjust the generator for 1750Ω .0025VAC signal input to secondary of output transformer.
In test unit connect a 51Ω resistor across secondary of output transformer. Connect output meter in parallel with 51Ω resistor.
With the 2-3 wire switches of both units in the 3 wire position (right, rear view), the output meter should indicate 4VAC or more (polarize plugs for maximum output).

SQUELCH CHECK
Remove all other units from line. Place "TL" lever to "Listen" position (horizontal).
The cathode voltage of the audio output tube (V1) should vary from 24VDC with the squelch control fully counter clockwise to 3VDC when the squelch control is fully clockwise.
Set up the standard and test units as under "Receiver Check".
Connect the DC probe of a VTVM to pin 1 (grid) of 12AU6 (V1), common to B-. VTVM should indicate not less that 3.5VDC.

CHASSIS—BOTTOM VIEW



PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12AU6	♦1.3KΩ 115KΩ	12KΩ	12Ω	0Ω	†270KΩ	†270KΩ	12KΩ
V 2	50C5	150Ω	470KΩ	12Ω	60Ω	470KΩ	†2.9KΩ	†440Ω
V 3	50C5	0Ω	390KΩ	110Ω	60Ω	390KΩ	†♦500Ω	†♦500Ω

ALL MEASUREMENTS TAKEN IN "LISTEN" POSITION UNLESS OTHERWISE SPECIFIED
♦ MEASURED IN "TALK" POSITION
† MEASURED FROM OUTPUT OF M1 (SELENIUM RECTIFIER)

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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